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BUREAU OF COMMERCIAL FISHERIES
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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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COMMERCIAL FISHERIES REVIEW

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CERTIFICATION AND AFTER-USE MEASUREMENT OF MANILA OTTER-TRAWL COD ENDS

By Ernest J. Medico*

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ABSTRACT

Describes the development and summarizes some results of the program for certifying manila twine cod ends used by the United States trawling fleet in the fishery for haddock, Melanogrammus aeglefinus (Linnaeus), in Northwest Atlantic Fishery Convention Subarea 5. To implement international treaty agreements concerning this fishery and to assist the industry in complying with mesh-size regulations, a program was developed for certifying new dry cod ends, which met certain tests, as having meshes equivalent to $4\frac{1}{2}$ inches when wet after use. Measurements were made of these manila cod ends, after varying amounts of use in the haddock fishery, to determine changes in after-use mesh size.

In June 1953 when regulations implemented the use of meshes for otter trawls fishing in Subarea 5, a mesh size of $5\frac{7}{8}$ inches (dry, knot center to knot center) was recommended for new before-use cod ends. Upon further study the before-use mesh size was lowered to $5\frac{5}{8}$ inches, because the meshes stretched after use to a greater degree than anticipated.

INTRODUCTION

To effect a joint approach to the problems arising in the fisheries of the Northwest Atlantic Ocean, the United States convened a conference of 11 governments at Washington in January 1949. The work of this conference resulted in opening for signature on February 8, 1949, the International Convention for the Northwest Atlantic Fisheries which has as its objective the conservation of the fisheries of the Northwest Atlantic Ocean. The Convention entered into force on July 3, 1950, and the International Commission provided for in Article II held its first meeting in April 1951. Today 12 nations are members of this commission: Canada, Portugal, Denmark, Spain, France, United Kingdom of Great Britain and Northern Ireland, Iceland, United States, Italy, U. S. S. R., Norway, and West Germany.

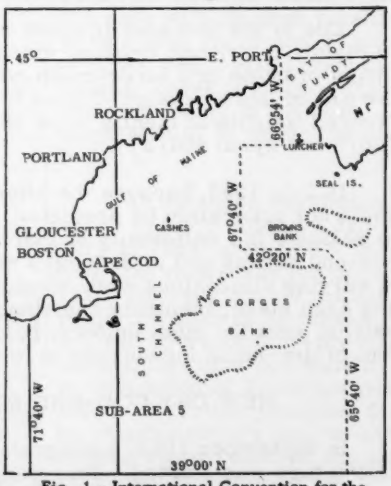

Fig. 1 - International Convention for the Northwest Atlantic Fisheries Subarea 5 where haddock regulations are in effect.

The otter trawl is the major type of fishing gear used in the North Atlantic Ocean and in many instances trawls constructed of small meshes catch and cause to be destroyed fishes that are below the proper size for maximum utilization. Reduction of the loss to the fishery of these small fish may be achieved through mesh-size regulations as there is ample demonstration of the ability of fish to escape through cod ends when an appropriate larger mesh

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size is selected. Therefore, in an attempt to bring about proper management measures in the otter-trawl fishery for haddock, the United States and Canada accepted a proposed experimental mesh-size regulation. To this end the Secretary of the Interior published in the Federal Register on December 30, 1952, a Notice of Proposed Rule Making which, when effective, would prohibit fishermen of the United States from taking haddock in Convention Subarea 5 (fig. 1) with a net having a mesh size of less than $4\frac{1}{2}$-inches internal measure when wet after use. Because net fibers shrink after immersion in water and meshes enlarge due to tightening of knots when hoisting catches, this measurement cannot be used as a specification for a new dry net. Since fishermen engaged primarily in haddock fishing use 5-inch or 6-inch mesh sizes in the forward parts of their nets, the emphasis of the regulation was placed on the cod ends in which 80 percent or more of the fish escapement occurs. The mesh sizes of cod ends in use before regulations became effective were of $3\frac{7}{8}$ inches or smaller. Fishery biologists conducted experiments at sea aboard large otter trawlers using manila cod ends of several mesh sizes ranging from $4\frac{7}{8}$ to $6\frac{3}{8}$ inches. The results of these experiments revealed that the $5\frac{7}{8}$-inch mesh size was optimum at that time.

Because sufficient before-use data had not been developed, the original mesh regulation made no provision for the certification of new nets; however, it was felt that the fishermen could not be expected to determine what mesh size in a new cod end would shrink or stretch to the required minimum of $4\frac{1}{2}$ inches after use. The regulation went into effect at midnight May 31, 1953, and the U. S. Fish and Wildlife Service recommended a mesh size for new before-use double manila twine cod ends of $5\frac{7}{8}$ inches per mesh.

During June 1953, Fish and Wildlife Service personnel held numerous discussions with vessel owners, fishermen, twine dealers, and manufacturers. It was found that a number of different weights of manila, cotton, and some synthetic twines were being used in the cod ends of haddock trawls. These are made primarily of manila for the large trawlers and of cotton and synthetics for the smaller boats. Manila was mostly used, because of its ease of repair and its relatively inexpensive replacement compared with cotton or synthetics. All manila cod ends in use were made of double twine and were imported from either the Netherlands or England. Cotton and synthetic double and single twines used were manufactured in the United States.

Due to the increase in mesh size, it was found that heavier twine was necessary to maintain strength because there are fewer meshes and consequently a reduced amount of twine in a large-mesh cod end. This simplified the problem by eliminating the use of lighter-weight twines in the manufacture of large-mesh cod ends. The favored weights of manila were 45, 50, 75, and 80-yard, four-ply twines, cotton 120/3 and nylon 400/3.

In July 1953, because the after-use behavior of natural and synthetic fibers could not accurately be predicted, a series of tests were made by Service personnel to evaluate the uniformity of individual mesh sizes within a section of hand-knitted cod-end netting and to develop a method for certifying cod ends. Blocks of netting of varying dimensions were stretched under 50, 100, 150, and 200 pounds of tension and each mesh, including one knot, was measured longitudinally. The 200-pound tension gave the most uniform results and was recommended for adoption in the system of dry-mesh measurement for certifying new cod ends.

NEW DRY COD-END MEASUREMENTS FOR CERTIFICATION

In September 1953, a program of measuring and marking cod ends with certification tags was started. This was done to permit use of cod ends of known before-use dimensions, while research was conducted to determine proper new mesh sizes.

Certification tags are made of brass, $\frac{5}{8}$-inch wide, $1\frac{1}{4}$-inches long, and $\frac{1}{32}$-inch thick; the initials "F.W.S." (Fish and Wildlife Service) and a serial number are stamped on each. The metal strips are rolled into tubes with a small opening for insertion of the twine. After each tag is placed on the twine, it is squeezed firmly so that it doesn't slide; the overlapping ends of the strip are then soldered with lead (figure 2).

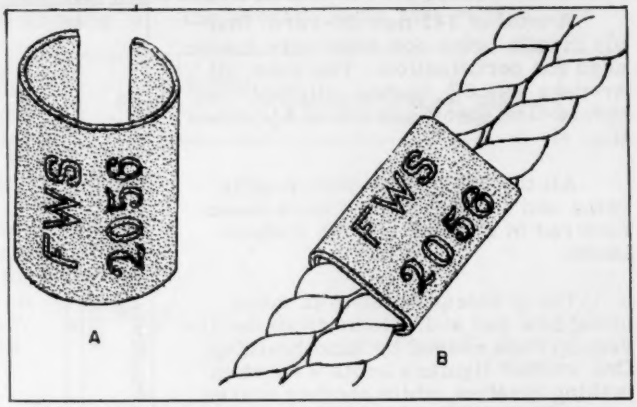

Fig. 2 - Certification tag. A - unattached. B - attached to mesh.

The procedure followed in measuring new dry cod ends is described as follows: A single series of meshes at least midway between the lacings is stretched under 200 pounds tension measured on a spring scale. While under this tension, the length of the row is measured in inches; neither the first half mesh nor the last half mesh is considered because of distortion. The average mesh size is then found by dividing the number of full meshes measured into the measured length of the row.

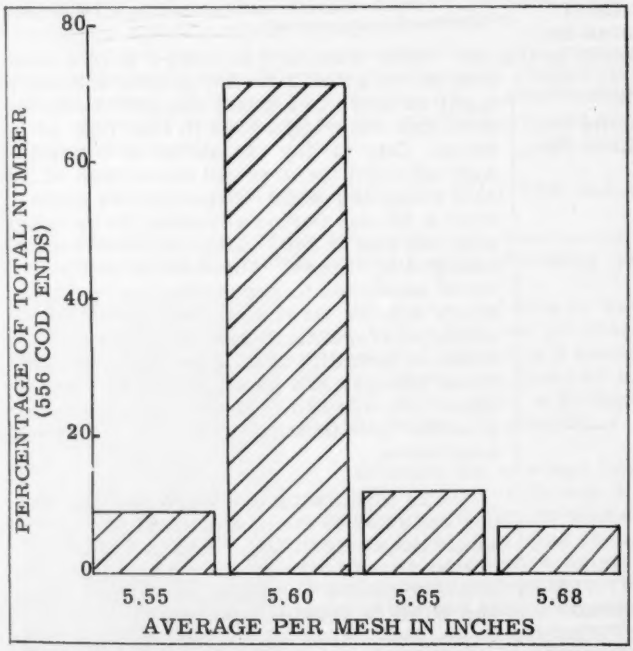

Fig. 3 - Distribution of the average mesh size of 556 50-yard, 4-ply manila twine cod ends.

From September through the end of 1953, wet-mesh measurements of 50-yard, four-ply manila twine cod ends used by the commercial fishing fleet and built on the $5\frac{7}{8}$-inch specifications showed that almost 80 percent were oversize. Experimental cod ends with $5\frac{1}{2}$-inch meshes and cod ends with $5\frac{7}{8}$-inch meshes were $\frac{7}{8}$ inch under and $\frac{1}{4}$ inch over the required $4\frac{1}{2}$-inch minimum. These findings justified a lowering of the new mesh size to $5\frac{5}{8}$-inches in early 1954.

The amended regulation, which became effective January 1, 1954, specified a before-use mesh size for 50-yard, four-ply double manila twine cod ends of $5\frac{5}{8}$ inches, and for 80-yard, four-ply double manila twine cod ends a specification of $5\frac{1}{2}$ inches per mesh. It further provided for the attachment of a seal to such netting which removed the liability of the fishermen for the action of the twine during use.

In 1954, from April through December, 556 new 50-yard, four-ply manila twine cod ends were measured for certification. Cod ends made of this size twine averaged $5\frac{39}{64}$ inches per mesh, $\frac{1}{64}$ inch under before-use specifications of $5\frac{5}{8}$ inches (fig. 3).

A total of 145 new 80-yard, four-ply manila twine cod ends were measured for certification. The over-all average was $5\frac{9}{16}$ inches, slightly over before-use specifications of $5\frac{1}{2}$ inches (fig. 4).

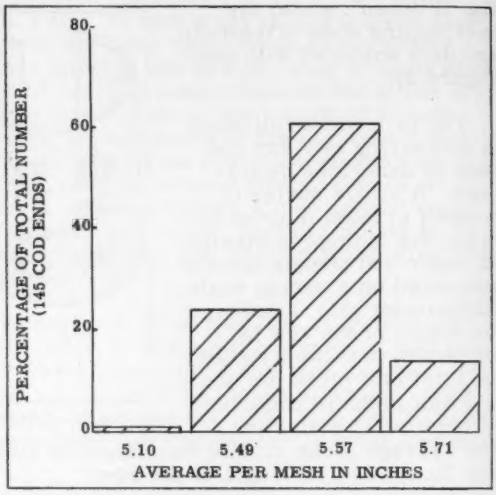

Fig. 4 - Distribution of the average mesh size of 145 80-yard, 4-ply manila twine cod ends.

All the 50- and 80-yard manila twine cod ends measured were manufactured in England and the Netherlands.

The greatest problem in measuring new cod ends stems from the irregularities caused by hand braiding. One worker tightens knots well when making meshes, while another makes looser knots. This has a bearing on the final over-all 200-pound tension measure. A cod end that in all probability would meet specifications at the manufacturer's loft, would not meet specifications in the United States due primarily to the loosening of knots in transit. Once knots are loosened, it is a problem to retighten them for proper measurement as there is a great amount of resistance and shearing action in this type of twine. Day-to-day variations in humidity also affected the over-all dimension of manila twine cod-ends. Experiments made over a 30-day period revealed that a manila cod end of $285\frac{3}{8}$ inches in total length changed $5\frac{3}{4}$ inches. The contraction per mesh amounted to approximately $\frac{3}{64}$ inch below and the stretch $\frac{1}{16}$ inch above the initial average mesh size at an average relative humidity of 66.8 percent. Since these changes are so slight and no tolerances are allowed, cod ends are not measured for certification under extremely damp conditions.

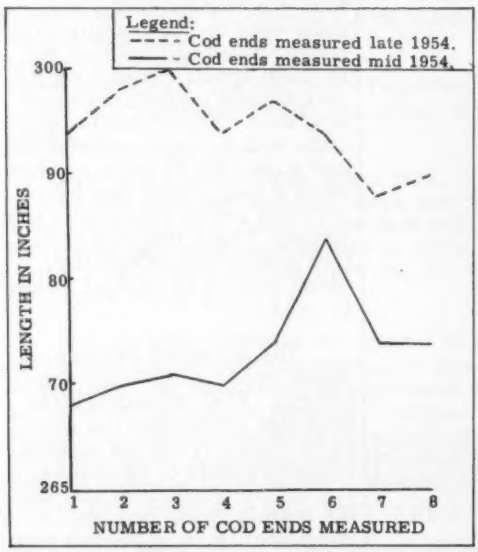

Fig. 6 - English 80-yard, 4-ply manila twine cod-end measurements compared.

The manufacturers were notified that cod ends had to meet specifications or they would not be certified. This led to an increased mesh size by the manufacturer in order to insure certification by U. S. Fish and Wildlife Service agents.

Cod-end specifications for 50-yard, four-ply manila twine manufactured in England were increased $\frac{1}{8}$ inch by the importing net dealer to assure certification

upon tightening of knots. Netherlands manufacturers increased their specifications by $\frac{1}{4}$ inch for this weight manila twine.

A comparison of measurements was made on eight Netherlands 50-yard, four-ply manila cod-ends in mid-1954 with eight received later in the year, after the manufacturer increased his dimension (fig. 5). The average mesh size ranged from 5.80 to 6.12 inches.

Manufacturers in Grimsby, England, were requested to measure and mark each cod end placed in a bale for shipment to the United States. Ten cod ends were constructed of 80-yard, four-ply manila twine and each net was marked with the measurement made by the manufacturer. Upon arrival they were measured by U. S. Fish and Wildlife Service agents to compare results (fig. 6).

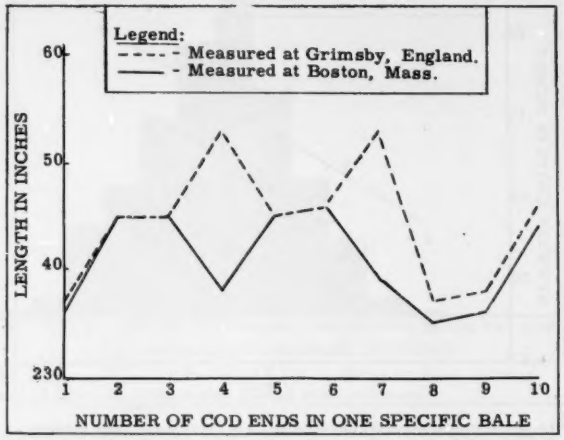

Fig. 6 - English 80-yard, 4-ply manila twine cod-end measurements compared.

During the first 6 months of 1955, 153 50-yard four ply and 164 80-yard four-ply manila twine cod ends were measured. Most of these were above the required specifications because of manufacturers' increased dimensions. The average mesh size in the Grimsby cod ends made from 50-yard manila twine ranged from slightly over $5\frac{5}{8}$ inches to slightly over $5\frac{3}{4}$ inches new, before use, as the manufacturer decreased his specifications to $5\frac{11}{16}$ inches per mesh. Netherlands cod ends averaged between $5\frac{3}{4}$ and $5\frac{7}{8}$ inches per mesh.

WET AFTER-USE COD-END MEASUREMENTS

The gathering of wet, after-use data was accomplished by boarding the trawlers and measuring the trawls on completion of fishing trips.

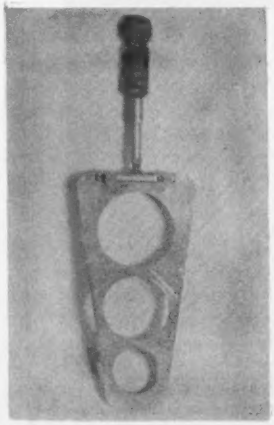

Fig. 7 - Measuring gauge.

All measurements of wet meshes for after-use data were made with a flat, wedge-shaped, spring-loaded gauge having a taper of 2 inches in 8 inches and a thickness of $\frac{3}{32}$-inch. Measurement was made by inserting the blade of the gauge into the mesh under a pressure of not less than 10 pounds nor more than 15 pounds.

Because the average life of original webbing in manila cod ends is approximately 3 trips, and seldom over 4 trips, considerable difficulty was encountered in gathering sufficient reliable data, that is, data from cod ends that are identifiable in their entire original lengths by Fish and Wildlife Service certification tags. Heavy fishing causes the after part of the cod end to stretch more rapidly than the forward part. This led to cutting off the stretched meshes in the after part of the cod end, the area of greatest tension from the hoisting strap to the end. A corresponding number of new meshes would be put on to replace those taken off. The forward part of the original cod end would be used on several

more trips because load tension is less in this area and meshes will not stretch until the useful life of the twine is practically gone. These lower meshes may be replaced several times before the entire cod end is replaced. Other factors are severe abrasion which weakens the twine and major alterations through mending. Differences of mesh sizes in forward and after sections can be as much as $\frac{1}{4}$ inch.

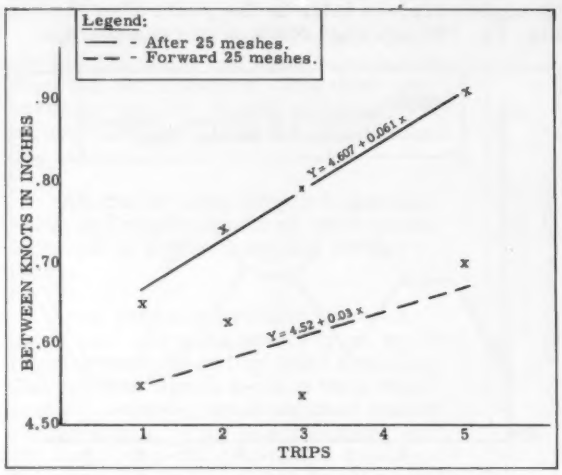

Fig. 8 - Comparison of the changes in size of forward and after meshes of 50-yard, 4-ply double manila twine cod ends.

Rope lines were fastened diagonally across the cod end from one side, lacing to the other from just above the hoisting strap to the end of the cod end. The purpose of these lines from the fisherman's point of view is to retard stretching and to prevent the cod end from bursting while lifting large quantities of fish. These lines and replacing of lower meshes introduce additional bias into the after-use data, as escapement equivalents are based upon the average useful life of the net. Alterations made during that period nullify data upon which certification is based.

Of several hundred cod ends that could be identified and measured during 1954, more than half were under $4\frac{1}{2}$ inches after use. Much of this was due to renewal of after-end meshes or one-trip cod ends. Under normal conditions, the knots in the twine are not sufficiently tightened to give true measure in one trip. Those that exceeded specifications ranged around $4\frac{7}{8}$ inches per mesh.

Figure 10 demonstrates dispersion about the mean of $4\frac{1}{2}$ inches for meshes in 15 manila cod ends. These cod ends were selected because they had not been cut to replace after-end meshes or altered in any way. These measurements were taken after one

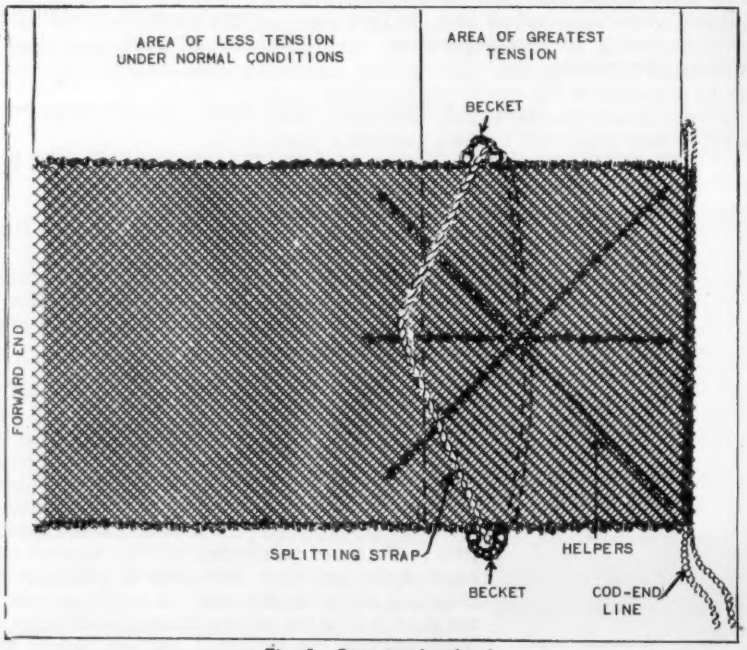

Fig. 9 - Otter-trawl cod end.

trip (at which time after-cod-end meshes are still elongating) through 3 trips, or the average life of a manila cod end under reasonable loads.

After-use data gathered through the years 1955, 1956, and 1957 revealed that cod ends made of 50-yard, four-ply manila twines were practically all within the specifications after use. Unmodified cod ends, identified by F. W. S. tags, used on 1 through 4 trips showed oversize meshes.

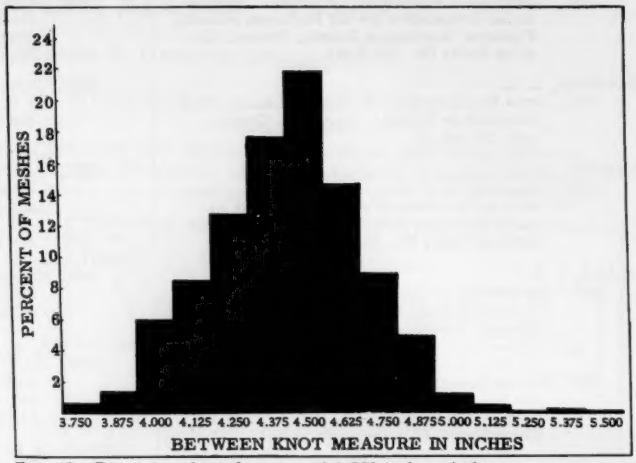

Fig. 10 - Dispersion about the mean of 4.500 inches of after-use measurements of 15 50-yard, 4-ply double manila twine cod ends.

OBSERVATIONS

The consensus of those engaged primarily in the haddock fishery is that the regulation is beneficial. Those engaged in the catching of other species including haddock are critical of the regulation. Their marketable catch is composed of all sizes and species, such as whiting and ocean perch, which either escape or gill in regulation-size haddock meshes.

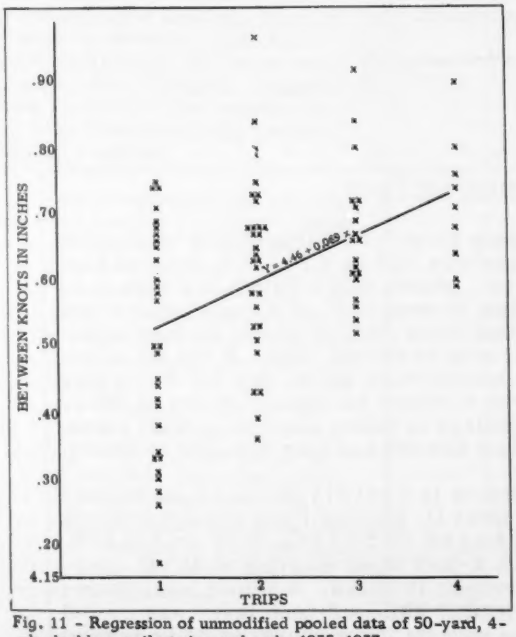

Fig. 11 - Regression of unmodified pooled data of 50-yard, 4-ply double manila twine cod ends, 1955-1957.

To manufacture cod ends with meshes of specified minimum before-use size and not have the meshes much larger than the specified minimum after fabricating is quite difficult. Keeping meshes to the size they were when manufactured is virtually impossible. Loosening of knots caused by handling, packing, and shipping results in a much smaller mesh and conversely the tightening loose knots will allow a gain of several inches in the total cod-end length. Because of this problem, manufacturers have increased mesh sizes to insure certification.

Rapid or slow enlargement of meshes is governed by the way in which a cod end is used. Hoisting of extremely heavy quantities of fish over the trawler's side would naturally stretch the meshes short of the shearing point more quickly, and only intermittent use with light loads will result in less stretch.

The mesh regulation is recognized by all who work with the fishery as a requirement for the use of an average mesh size designed to accomplish the primary objective of releasing haddock of a size sufficient to allow the maximum utilization of the resource.

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COOLING FISH FILLETS

The fishing industry has false ideas about the cooling ability of crushed ice; also too many believe that a little ice will do a lot. The general idea seems to be that once a fish, a can, or a plastic bag of fillets has been surrounded, even lightly, with crushed ice, irrespective of the thickness of the fish itself or the container of fillets, that rapid chilling and no further spoilage is assured. More often than not, such is not the case. If the lot of fillets happens to be thick and their temperature warm, say 60° F., it may take hours for the temperature to drop to where bacterial activity is effectively slowed down. Meantime, spoilage is taking place at a rapid rate. The answer to this situation is to ice heavily and use thin lots of fillets.

The effectiveness of icing thin layers is vividly shown by the following data taken from an English report (J. Science Food and Agriculture 9(2) 78-82, 1958): "When the packages of fillets were cooled with plenty of ice on both top and bottom, a 3-inch layer starting at 40° F. cooled to 38° F. in 2½ hours; a 6-inch layer took 10 hours. A 3-inch layer starting at 60° F. cooled to 33° F. in 4 hours; while a 6-inch layer was cooled from 60° F. to 36° F. in 10 hours and several more hours would be needed to reach 33° F." Thus the thickness of the layer is of very great importance.

BOTTOM TRAWLING EXPLORATIONS OFF SOUTHEASTERN ALASKA, 1956-1957

By Melvin R. Greenwood*

SUMMARY

Explorations to determine quantities and species of bottom fish available to commercial trawling gear in the offshore waters of Southeastern Alaska between Dixon Entrance and Hazy Islands were conducted by the U. S. Bureau of Commercial Fisheries during the fall of 1956 and spring of 1957. The fall investigation was made by the Bureau's exploratory fishing vessel John N. Cobb, and the spring investigation was made by the Tordenskjold, a Seattle commercial trawler chartered by the Bureau for this work with Saltonstall-Kennedy Act funds.

A considerable amount of clear trawling bottom was found throughout the area investigated at depths ranging from 50 to 200 fathoms. Alaska coral growths were encountered on much of otherwise clear bottom, but did not pose a serious problem to fishing efficiency and gear damage was usually slight. In some areas, however, the bottom topography precluded any possibility of trawling.

Pacific ocean perch was the most abundant food species caught, and many catches of more than 1,000 pounds per hour were made during the spring operations. Arrow-toothed flounder and Alaska pollock dominated catches during the fall exploration, and together they comprised 60 percent of the aggregate catches made by the John N. Cobb. A limited number of shrimp-trawl drags made by the Tordenskjold revealed good signs of pink shrimp and side-stripe shrimp; however, additional work is necessary to accurately determine the offshore shrimp potential in this area.

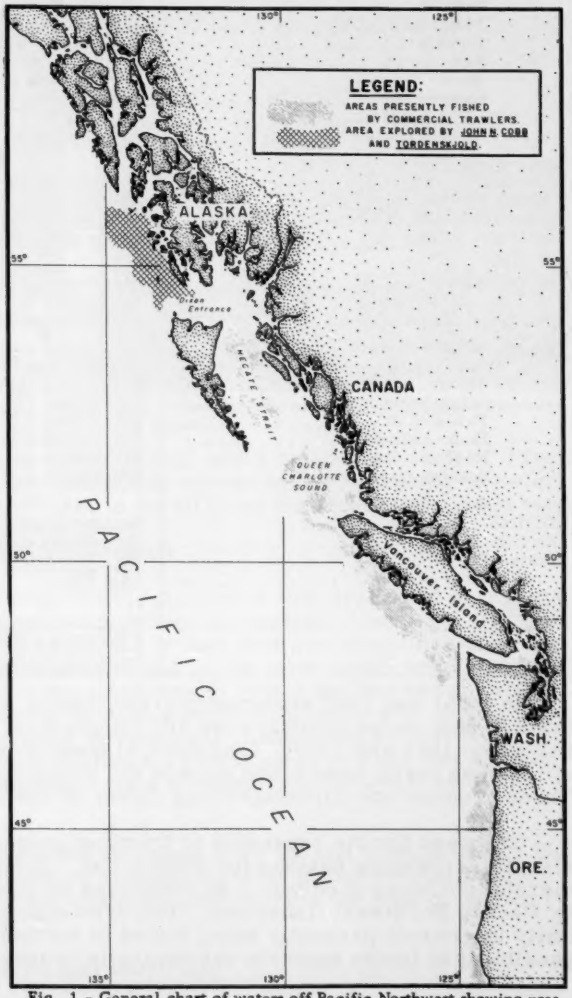

Fig. 1 - General chart of waters off Pacific Northwest showing present commercial bottom-fishing areas and the area explored by the John N. Cobb and Tordenskjold.

Weather conditions during the fall exploration were adverse, with strong winds and large swells predominating. The weather was generally favorable during the spring exploration.

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BACKGROUND

Exploratory fishing to determine quantities and species of bottom fish available to commercial-type trawls in ocean waters off Southeastern Alaska between Dixon Entrance and Hazy Islands was conducted by the U. S. Bureau of Commercial Fisheries in 1956 and 1957. The exploratory activities were carried out from October 7 to November 7, 1956, and from May 23 to June 30, 1957. The Bureau's exploratory fishing vessel John N. Cobb was used for the earlier cruise and a chartered commercial trawler, the Tordenskjold, was used to carry out the work in 1957. Funds for the charter were provided by the Saltonstall-Kennedy Act of 1954.

List of Common and Scientific Names of Fish and Shrimp Caught During Bottom Trawling Explorations off Southeastern Alaska, 1956-1957

Common Names		Scientific Names
Flat Fish:		
Sole:	Dover	Microstomus pacificus
	English	Parophrys vetulus
	Flathead	Hippoglossoides elassodon
	Petrale	Eopsetta jordani
	Rex	Glyptocephalus zachirus
	Rock	Lepidopsetta bilineata
	Slender	Lyopsetta exilis
Halibut		Hippoglossus stenolepis
Arrow-toothed flounder (turbot)		Atheresthes stomias
Round Fish:		
Lingcod		Ophiodon elongatus
Alaska pollock		Theragra chalcogramma
Sablefish (black cod)		Anoplopoma fimbria
True cod (gray cod)		Gadus macrocephalus
Rockfish:		
Black:	Black	Sebastodes melanops
	Yellow-tailed	Sebastodes flavidus
Pacific ocean perch		Sebastodes alutus
Red:	Black-throated	Sebastodes aleutianus
	Idiot (spiny-cheeked)	Sebastolobus alascanus
	Green-striped	Sebastodes elongatus
	Olive-backed	Sebastodes saxicola
	Priest-fish	Sebastodes mystinus
	Rock-salmon	Sebastodes paucispinis
	Rosy	Sebastodes rosaceus
	Spanish flag (banded)	Sebastodes nigrocinctus
Other Fish:		
Dogfish		Squalus acanthias
Ratfish		Hydrolagus colliei
Skate:	Big	Raja binoculata
	Long-nosed	Raja rhina
Shrimp:		
Pink		Pandalus borealis
Side-stripe		Pandalopsis dispar
Spot		Pandalus platyceros

The otter-trawl fishery of the Pacific Northwest began in the early 1920's in the waters within Puget Sound. Since its inception, the fishery has expanded to include grounds from off southern Oregon to northern Hecate Strait, British Columbia (fig. 1). The expansion of fishing grounds followed increased market demands for bottom fish and the inability of the original areas exploited to produce the quantities required.

In 1951 and 1952 exploratory trawl fishing was carried out aboard the John N. Cobb in deep water (mostly over 100 fathoms) off the Oregon and Washington coasts (Alverson 1951 and 1953). Commercial quantities of Dover sole, sablefish, and Pacific ocean perch were found outside the areas then being utilized by the fishery. These grounds are currently being fished by the Washington and Oregon trawl fleets.

The need for the expansion of trawling grounds is ever-present because of the steadily increasing demand for bottom fish. Investigations to determine the commercial potential of bottom fish resources off Southeastern Alaska were suggested by Pacific Northwest fishermen. The area explored was chosen because of its proximity to grounds presently being fished in northern Hecate Strait and because of the possibility of future markets developing in nearby Alaskan cities.

Fishing operations were carried out between latitudes 54°20' N. and 55°48' N. (Dixon Entrance to Hazy Islands) and from approximately 5 to 35 miles offshore at various depths from 56 to 208 fathoms. A total of 30 drags was made by the John N. Cobb in the fall and 85 drags by the Tordenskjold in the spring.

VESSELS USED

The general design of the John N. Cobb is that of a West Coast purse seiner, as are most vessels of the Pacific Northwest trawl fleet. The vessel has an over-all length of 93 feet with a beam of 25 feet and a mean-load draft of 9 feet (Ellson 1950). On a seine-type trawler, the net is set and towed from the stern and hauled over the starboard side.

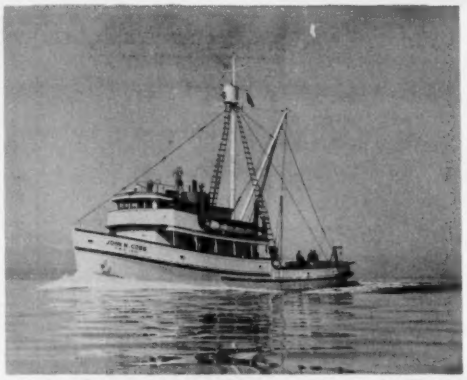

Fig. 2 - The exploratory fishing vessel John N. Cobb, a West Coast purse seine-type trawler.

Fig. 3 - The chartered vessel, Tordenskjold, a schooner-type trawler.

The Tordenskjold, a schooner-type vessel, was designed and built for halibut fishing (Sundstrom 1957), but was rigged for trawling in 1942. This vessel has an over-all length of 75 feet, a beam of 18 feet, and a mean-load draft of 9 feet. The net is set and hauled over the starboard side on this type of schooner-trawler and, as in the case of seine-type trawlers, is towed from the stern.

FISHING GEAR

A standard 400-mesh western otter trawl, similar to that described by Alverson (1951), with a $4\frac{1}{2}$-inch mesh[1/] cod end and a 400-mesh eastern otter trawl (fig. 4) with a $3\frac{1}{2}$-inch mesh cod end were used for the bottom-fish investigations. During the 1957 exploration, the last 6 feet of the cod end of the otter-trawl were lined with $1\frac{1}{2}$-inch mesh netting. The purpose of the liner was to retain shrimp encountered during otter-trawl drags. Areas which yielded significant quantites of shrimp when the cod end with the liner was used were subsequently fished with a 43-foot flat Gulf of Mexico-type shrimp trawl. This trawl had a $1\frac{1}{2}$-inch mesh cod end and was towed from a single cable using a 25-fathom bridle arrangement ahead of the doors (Schaefers & Johnson 1957).

A Dietz-LaFond type bottom sampler was used near the end of each drag. The subsequent bottom sample, in conjunction with the contents of the net and/or the type of gear damage sustained, was the basis for determining the type of bottom recorded for each drag.

TRAWLING BOTTOM

SUITABLE TRAWLING BOTTOM: A considerable amount of clear trawling bottom was located between the 50- and 200-fathom depth contours (fig. 5). Abundant

1/ All mesh sizes referred to in this report are stretched measure, including one knot.

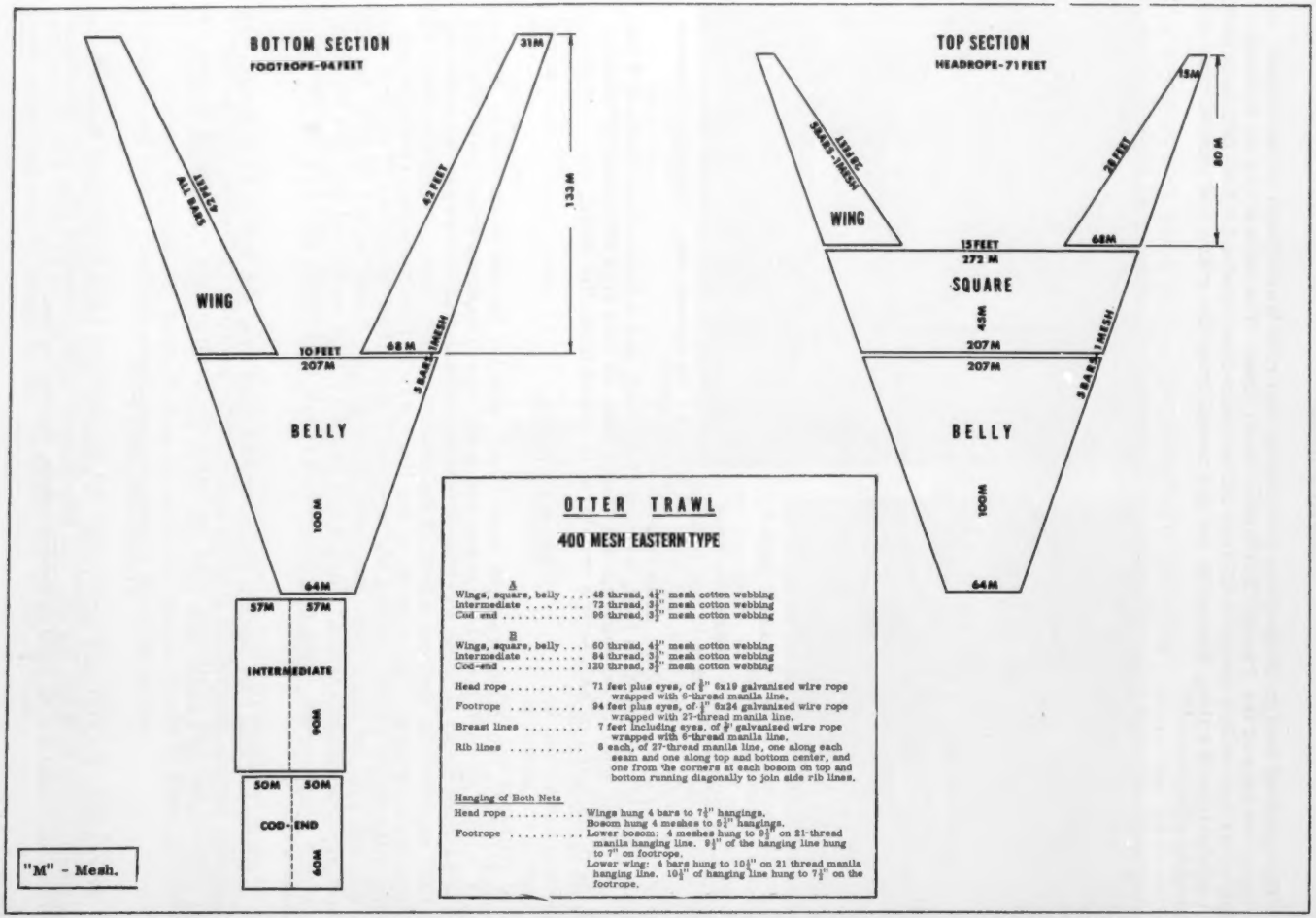
BOTTOM SECTION
FOOTROPE-94 FEET
31M
ALL BARS
WING
42 FEET
133 M
10 FEET
207M
68 M
3 BARS-1MESH
BELLY
100 M
64M
57M
57M
INTERMEDIATE
90M
50M
50M
COD-END
60M
"M" - Mesh.
TOP SECTION
HEADROPE-71 FEET
15M
WING
28 FEET
80 M
15 FEET
272 M
68M
SQUARE
43M
207M
207M
BELLY
100M
64M
OTTER TRAWL
400 MESH EASTERN TYPE
A
Wings, square, belly . . . . 48 thread, 4½" mesh cotton webbing
Intermediate . . . . . 72 thread, 3½" mesh cotton webbing
Cod end . . . . . 96 thread, 3½" mesh cotton webbing
B
Wings, square, belly . . . 60 thread, 4½" mesh cotton webbing
Intermediate . . . . . 84 thread, 3½" mesh cotton webbing
Cod-end . . . . . 120 thread, 3½" mesh cotton webbing
Head rope . . . . . 71 feet plus eyes, of ⅜" 6x19 galvanized wire rope wrapped with 6-thread manila line.
Footrope . . . . . 94 feet plus eyes, of ½" 6x24 galvanized wire rope wrapped with 27-thread manila line.
Breast lines . . . . . 7 feet including eyes, of ⅜" galvanized wire rope wrapped with 6-thread manila line.
Rib lines . . . . . 8 each, of 27-thread manila line, one along each seam and one along top and bottom center, and one from the corners at each bosom on top and bottom running diagonally to join side rib lines.
Hanging of Both Nets
Head rope . . . . . Wings hung 4 bars to 7½" hangings.
Bosom hung 4 meshes to 8½" hangings.
Footrope . . . . . Lower bosom: 4 meshes hung to 9½" on 21-thread manila hanging line. 9½" of the hanging line hung to 7" on footrope.
Lower wing: 4 bars hung to 10½" on 21 thread manila hanging line. 10½" of hanging line hung to 7½" on the footrope.

Fig. 4 - Details of a standard 400-mesh eastern-type otter trawl used for bottom-fish explorations off Southeastern Alaska.

growths of Alaska coral[2/] were encountered over much of the grounds fished, but these areas proved productive in spite of the nuisance of the minor gear damage sometimes incurred.

Clear Trawling Bottom: One of the largest areas free of snags was located from 4 to 17 miles west of Baker Island. This area measures about 12 by 18 miles. The bottom is composed of green mud and sand, for the most part, with sand and gravel found in the shallower eastern portion of the area. No hang-ups were experienced within this area during 17 otter-trawl and 6 shrimp-trawl drags made at depths from 56 to 94 fathoms. Hazardous grounds, however, were encountered to the south, east, and west of the area.

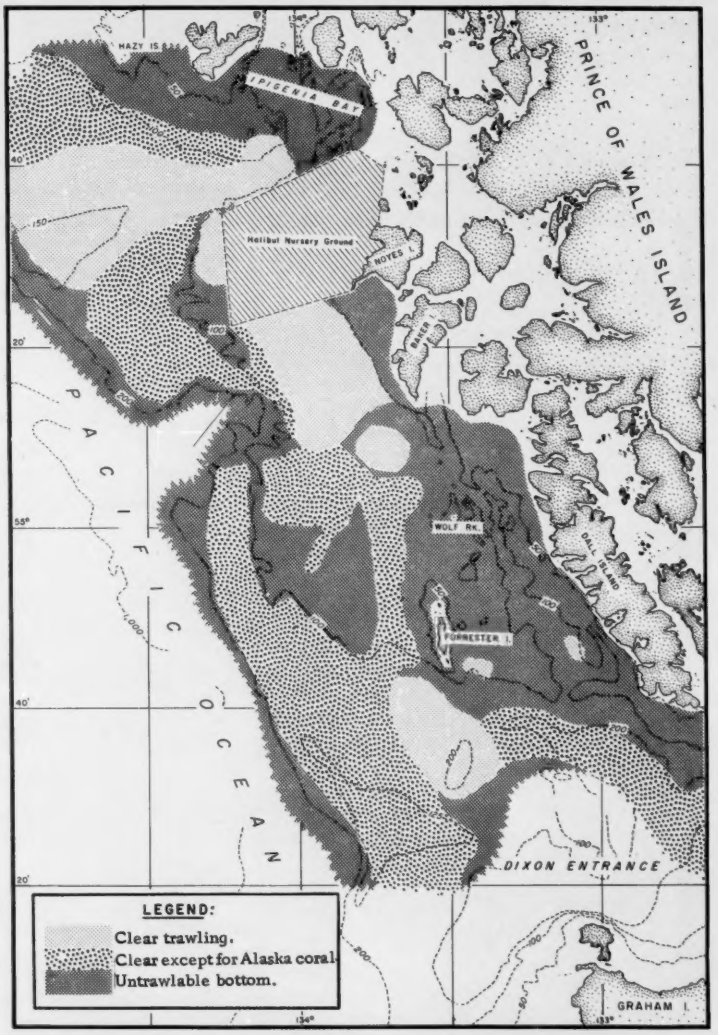

Fig. 5 - Chart depicting: (1) areas free of snags, (2) grounds where Alaska coral growths were encountered, and (3) areas unsuitable for trawling.

Another large area free of snags was located off Iphigenia Bay. This area is somewhat pear-shaped being about 5 to 10 miles wide inshore and from 15 to 20 miles wide in the deeper offshore part. The bottom topography is characterized by a trough or gully which extends offshore from Iphigenia Bay and fans out to form a deep basin at its outer extremity. Green mud and sand were found throughout the region with some gravel noted on the southeast slope of the basin and in parts of the gully. A total of 20 otter-trawl drags was made in this area at depths ranging from 87 to 165 fathoms with minor gear damage experienced during only two drags which were made on the north slope of the gully near Iphigenia Bay.

A small clear basin, about 6 miles in diameter, lies 5 to 11 miles south of Cape Bartolome. It is separated from the Baker Island clear grounds mentioned above by

2/Alaska coral is a soft coral and is related to the tropical soft corals (sea fans etc.). It is not similar to the stony corals normally encountered in tropical waters.

a narrow strip of uneven bottom. Two otter-trawl drags and 5 shrimp-trawl drags were made at depths from 84 to 93 fathoms in this basin without encountering obstructions.

Another small clear area was found next to the western boundary of the halibut nursery grounds off Noyes Island. The bottom in this region is composed of green mud and sand. Five otter-trawl drags made in this area at depths from 77 to 97 fathoms encountered no snags. Other areas found to be free of snags are shown in figure 5.

Alaska Coral: A large amount of the ocean bottom off Southeastern Alaska would be excellent for trawling except for considerable growths of Alaska coral. This growth

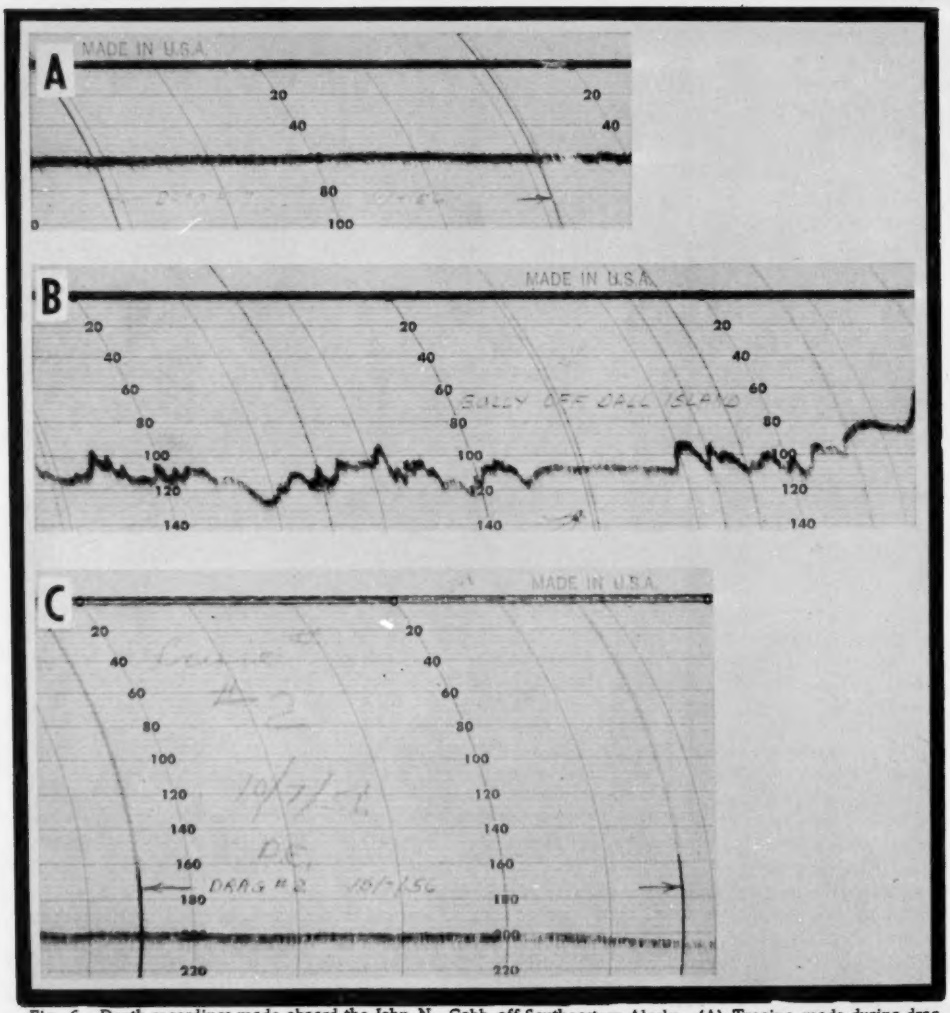

Fig. 6 - Depth recordings made aboard the John N. Cobb off Southeastern Alaska. (A) Tracing made during drag which hung up solid, probably on Alaska coral. (B) Typical bottom trace made in gully between Forrester and Dall Islands. (C) Tracing made in Dixon Entrance during drag which resulted in the loss of the complete net and one door.

is not easy to detect with commercial echo-sounding equipment (fig. 6-A), but is prominent enough to hang up a trawl and stop a vessel, even one the size of the John N. Cobb. Slight gear damage usually resulted from such hang-ups and occasionally no damage at all occurred to the net. Some hang-ups, however, resulted in damage requiring several manhours to repair the gear.

In addition to actual specimens taken in the net (fig. 7), the type of gear damage experienced gave further evidence that Alaska coral was the chief cause of snagging. The upper leading edge of the net, particularly on the wings, received the most wear; and broken hangings, lost floats, badly chafed "dandy lines," and chafing of the headrope were common types of damage suffered.

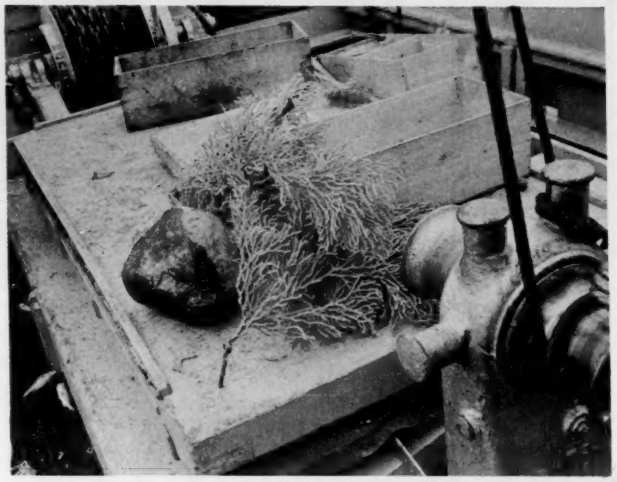

Fig. 7 - Alaska coral picked up during exploratory trawling by the Tordenskjold.

A substantial portion of the localities showing Alaska coral in figure 5 are trawlable, although a risk of incurring minor gear damage exists. It was sometimes found possible to work the gear free from coral snags and continue towing. Evidently the fishing ability of the net is not greatly affected by the presence of Alaska coral. Two drags which encountered snags yielded catches of 3,000 and 3,700 pounds of Pacific ocean perch. Several other drags which hung up solidly caught fish at rates in excess of 1,000 pounds an hour.

UNTRAWLABLE AREAS: Localities found unsuitable for trawl operation included: (1) all areas explored inside the 50-fathom depth contour, (2) Iphigenia Bay, (3) inside the 100-fathom depth contour immediately south of Hazy and Coronation Islands, (4) the 110-fathom edge off Cape Bartolome, and (5) the continental slope at depths ranging from about 200 to 400 fathoms. The gully and adjacent slopes between Forrester and Dall Islands also offered little in the way of suitable trawling bottom (fig. 6-B).

Although navigational charts and depth recordings (fig. 6-C) indicated favorable trawling bottom in Dixon Entrance east of Learmonth Bank at depths of over 100 fathoms, of the two drags made, one resulted in the loss of the complete net and one door. Because of strong currents, speed and directional control were difficult and it was apparent that not enough time was available to obtain significant results. A careful analysis of currents and tides would be necessary along with the possibility of having to wait for slack water to accomplish the actual trawling.

FISHING RESULTS

Positions of otter-trawl and shrimp-trawl drags made during the two cruises are shown diagrammatically in figures 8 and 9, and the catches and particulars for each drag are given in tables 2, 3, and 4. Drags in which snags or torn gear were encountered have been plotted on the charts for quick reference.

Pacific ocean perch were caught in commercial quantities during both explorations with the best catches in the spring; and several good catches of black rockfish

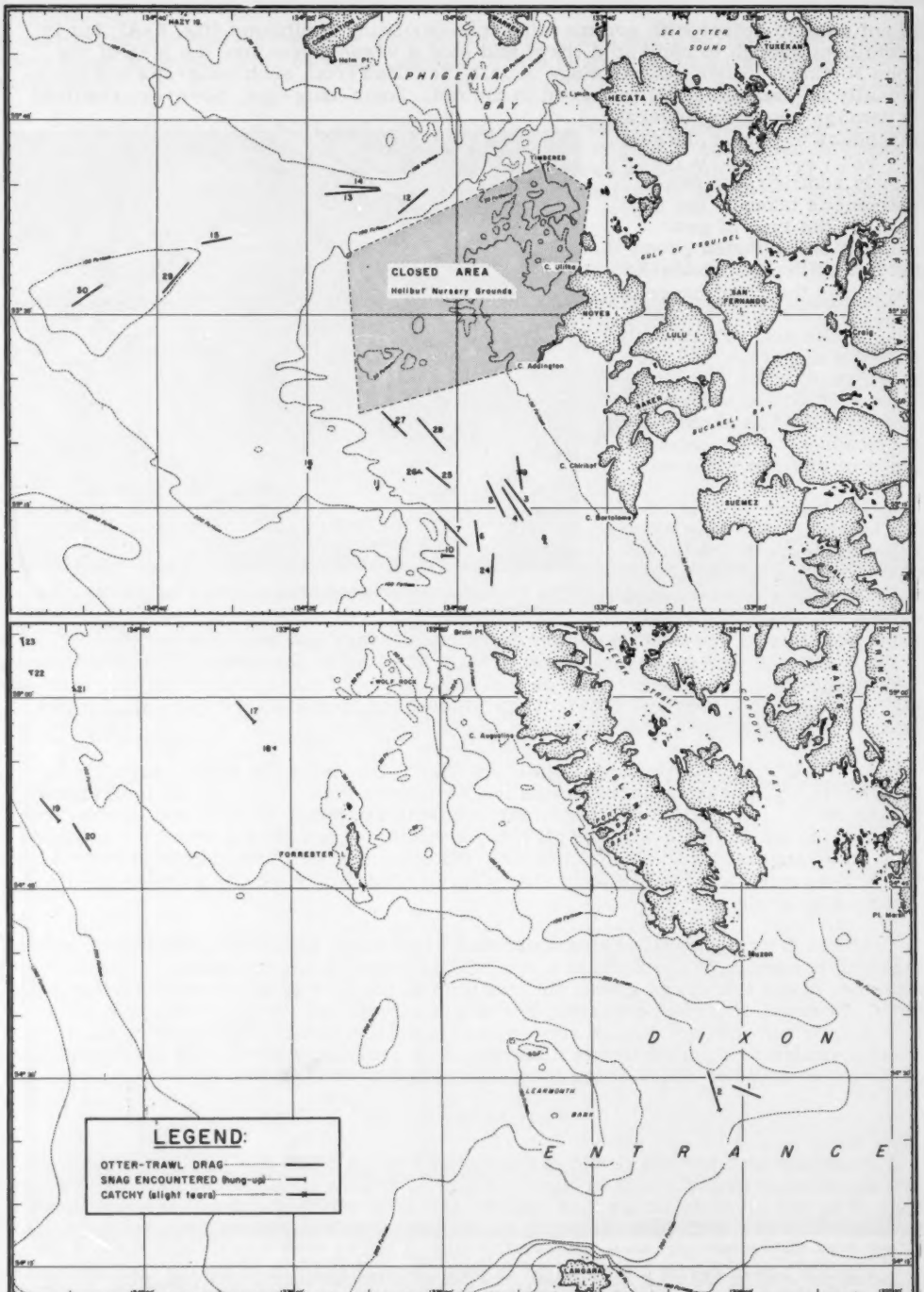

Fig. 8 - Exploratory otter-trawl drags made off Southeastern Alaska by the M/V John N. Cobb--October and November 1956.

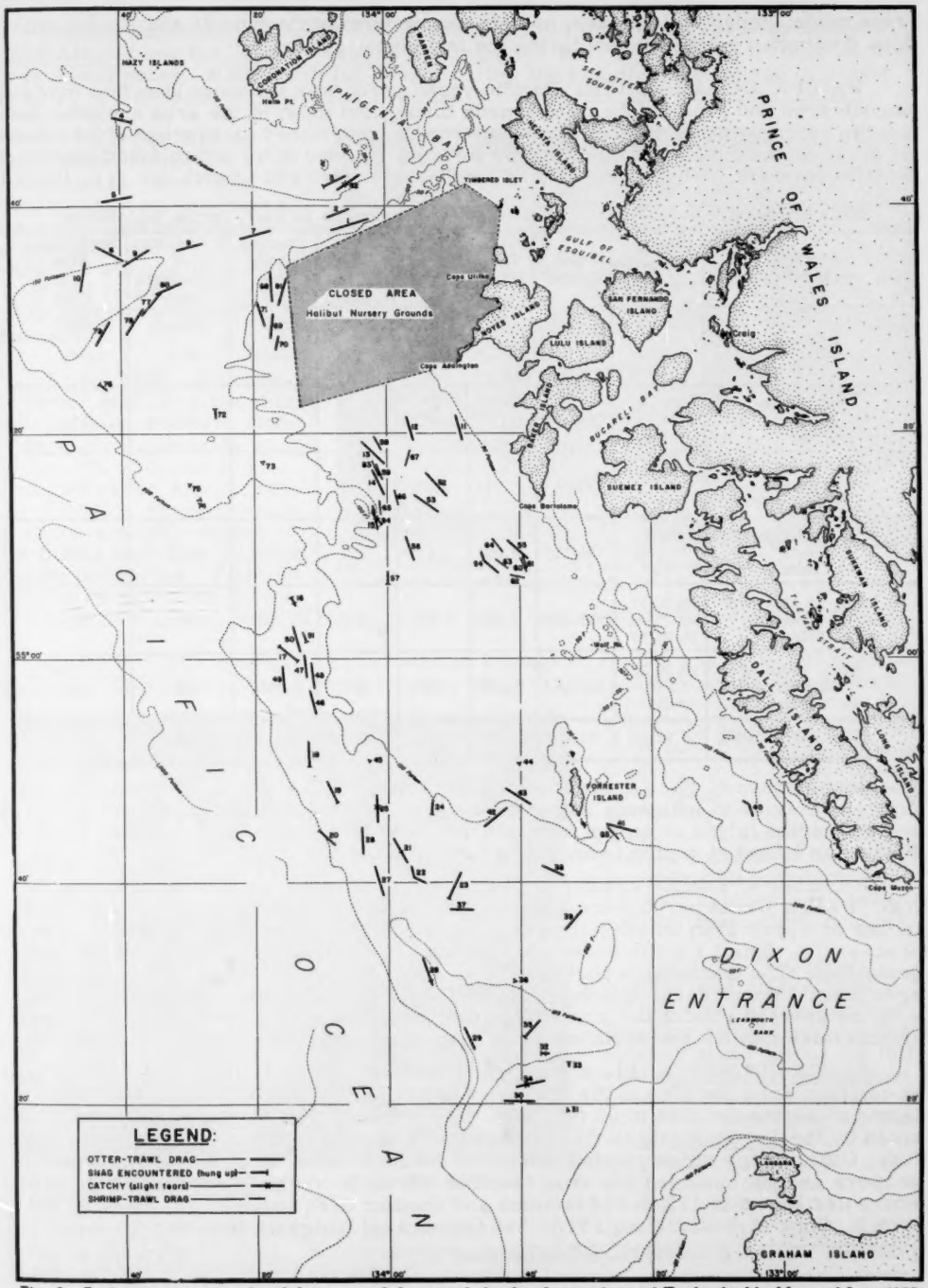

Fig. 9 - Exploratory otter-trawl and shrimp-trawl drags made by the chartered vessel Tordenskjold--May and June 1957.

were made. Industrial species, namely arrow-toothed flounder[3/] and Alaska pollock dominated catches made during the fall investigation.

PACIFIC OCEAN PERCH: Pacific ocean perch was the most abundant food fish encountered and good catches were made throughout most of the area explored during the spring cruise. Thirty-six otter-trawl drags, fished an average of 53 minutes each, at depths ranging from 87 to 152 fathoms, yielded from 100 to 5,250 pounds of Pacific ocean perch per drag. These catches averaged 970 pounds per drag (table 1).

Table 1 - Pacific Ocean Perch Catches of 100 or More Pounds an Hour, Spring Exploration

General Area	Drag	Depth Range	Total Caught	Average Catch Per Drag	Total Trawl on Botton	Average Catch Per Hour	Percentage of Marketable Size	Marketable Size Per Hour
	No.	Fathoms	Lbs.	Lbs.	Minutes	Lbs.	Avg. %	Lbs.
Gully, off Iphigenia Bay	1, 2, 3, 7, 68, 82	87-122	9,975	1,665	360	1,665	81%	1,365
Basin, off Iphigenia Bay	5, 6, 8, 76, 77, 79, 80	105-152	3,585	510	387	555	86%	475
Edge, 30 miles off Cape Bartolome	74 75	110-113	235	120	20	705	95%	670
Edge, 25 miles off Wolf Rock	46, 47, 48, 49, 50	106-116	8,050	1,610	300	1,610	91%	1,465
Edge, 15 miles off Forrester Island	19, 20, 21, 22, 23, 25, 26, 27, 37	110-139	7,625	845	515	890	95%	845
Spit, south of Forrester Island	28, 29, 30, 32, 33, 34, 35	112-140	5,500	785	315	1,050	93%	975
TOTALS AND AVERAGES	36 drags	87-152	34,970	970	1,897	1,105	89%	985

The best catches of Pacific ocean perch were made in the following localities: (1) the gully outside of Iphigenia Bay at depths from 87 to 122 fathoms; (2) off Wolf Rock and Forrester Island at depths from 106 to 139 fathoms; and (3) on the spit south of Forrester Island at depths from 112 to 140 fathoms.

A number of Pacific ocean perch catches contained a notable amount of small fish. Pacific ocean perch were considered of marketable size when measuring $10\frac{1}{2}$ inches or over. Fish smaller than this are not generally accepted by Pacific Coast processors. Small Pacific ocean perch were prevalent in the drags made off Iphigenia Bay. The marketable portion of catches in this area contained fish that averaged about 1 pound each. Catches made off Wolf Rock contained fewer small fish, with the average size of the marketable fish being about $1\frac{1}{2}$ pounds each. The marketable-size fish caught south of Forrester Island averaged nearly 2 pounds each.

BLACK ROCKFISH: Black rockfish (mostly Sebastodes melanops) were caught in commercial quantities in the area west of the halibut nursery grounds off Noyes Island at depths from 84 to 90 fathoms. Two 1-hour drags (numbers 69 and 81) made by the Tordenskjold in this area caught a total of 4,000 pounds of black rockfish. Other drags which yielded catches of black rockfish at a rate of 1,200 pounds or more an hour included one drag (number 32) made by the Tordenskjold south of Forrester Island in 112 to 113 fathoms and another drag (number 15) made by the John N. Cobb at depths from 131 to 141 fathoms off Iphigenia Bay.

3/Commonly referred to as turbot by Pacific Coast fishermen.

Smaller amounts of black rockfish were taken in many tows made by both the Tordenskjold and the John N. Cobb indicating their wide distribution throughout the area investigated. Black rockfish caught during the explorations ranged in weight from $2\frac{1}{2}$ to 6 pounds and averaged $3\frac{1}{4}$ pounds.

OTHER ROCKFISH: Miscellaneous species of red rockfish were taken during both seasons in small amounts ranging up to an aggregate total of 380 pounds an hour. Most of the catches of red rockfish were taken at depths exceeding 100 fathoms.

Fig. 10 - Spilling the last lift of a good catch of marketable size Pacific ocean perch aboard the Tordenskjold.

FLAT FISH: Catches of Dover sole, English sole, petrale sole, and rock sole were made in amounts up to 250, 60, 150, and 175 pounds an hour, respectively. Flat fish were generally more available during the fall exploration than during the spring. Flatfish were most prevalent on the flat off Baker Island, west of Iphigenia Bay, and west of Forrester Island.

ROUND FISH: Sablefish were taken in 9 drags in amounts of 50 to 580 pounds an hour. Except for 1 catch (drag number 20 in the fall) the sablefish caught were less than marketable size, averaging about 1 pound each. True cod in amounts ranging from 50 to 175 pounds an hour were caught in 7 drags during the spring cruise. Only 2 drags made during the fall yielded catches of true cod exceeding 50 pounds an hour. Lingcod catches were insignificant during both cruises.

Fig. 11 - Second split of a "2 splits and a lift" catch of mostly arrow-toothed flounder aboard the John N. Cobb.

ARROW-TOOTHED FLOUNDER AND ALASKA POLLOCK: Arrow-toothed flounder and pollock dominated catches made during the fall cruise. Although these species are not normally marketed as food fish along the Pacific Coast, their use as animal food has increased considerably during the past few years. Arrow-toothed flounder comprised 36 percent and pollock 24 percent by weight of the aggregate catches made by the John N. Cobb. These species were most prevalent on the grounds explored off Baker Island and northward.

OTHER INDUSTRIAL FISH: Ratfish was taken over much of the area covered during both phases of the explorations but was not caught in significant amounts.

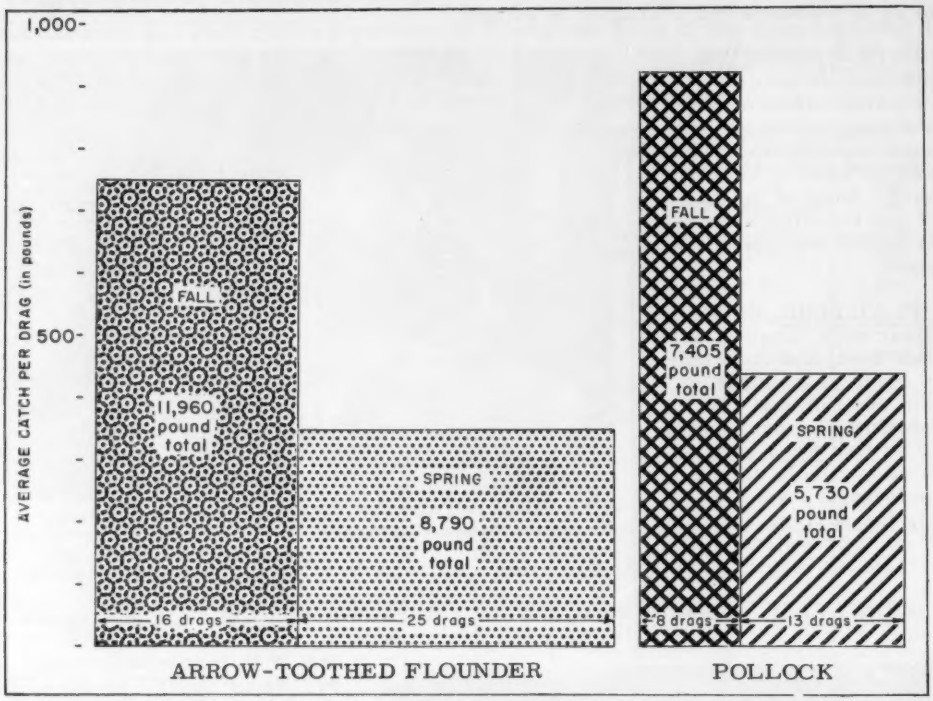

Fig. 12 - Arrow-toothed flounder and pollock catches of 100 or more pounds an hour made during explorations off Southeastern Alaska--1956 and 1957.

Dogfish and skate catches were small, amounting to less than 35 pounds in any single drag.

SHRIMP: No attempt was made to ascertain the shrimp potential during the fall cruise, and only a few shrimp drags were made in the spring as the main objective of the explorations was to define the quantities and the types of bottom fishes available. Catches made in the spring with the lined otter trawl revealed some quantity of pink, side-stripe, or spot shrimp throughout the area explored. Pink shrimp were caught at depths ranging from 68 to 157 fathoms, side-stripe shrimp at depths from 77 to 190 fathoms, and spot shrimp at depths between 88 and 140 fathoms. The Gulf shrimp

Fig. 13 - Catch of mostly pink shrimp caught 7 miles south of Cape Bartolome. Note the scarcity of miscellaneous fish.

trawl, used in areas where the otter trawl gave promising signs, made catches of up to 340 pounds of pink shrimp per 30-minute tow (drag number 62). The best shrimp catches were made in the small basin south of Cape Bartolome (fig. 13).

WEATHER

Weather conditions encountered during the two seasons were entirely different. An almost continuous wave of storms buffeted the Southeastern Alaska coast with winds clocked up to 75 knots during the fall of 1956. Between storms, a heavy southwesterly swell often made exploratory fishing impracticable. Air temperatures, recorded at the beginning of each drag, ranged from 40° F. to 50° F. and averaged 45.0° F.

During the spring exploration of 1957, the weather was mostly favorable. Other than moderate afternoon and evening winds, only 3 brief storms were encountered. Air temperatures recorded during the spring dragging operations ranged from 44° F. to 61° F. and averaged 51.5° F.

APPENDIX

Detailed fishing logs are not included in the Review, but are available upon request as an appendix to the reprint of this article. Request Separate No. 532. The reprint which contains the appendix includes these tables:

Table 2 - Fishing Log of Otter-Trawl Drags Made off Southeastern Alaska from Dixon Entrance to Iphigenia Bay--October, November 1956--U. S. F. W. S. M/V John N. Cobb.

Table 3 - Fishing Log of Otter-Trawl Drags Made off Southeastern Alaska from Dixon Entrance to Hazy Islands--May, June 1957--U. S. F. W. S. Chartered Vessel Tordenskjold.

Table 4 - Fishing Log of Shrimp-Trawl Drags Made off Southeastern Alaska from Dixon Entrance to Baker Island--June 1957--U. S. F. W. S. Chartered Vessel Tordenskjold.

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TECHNICAL NOTE NO. 48 - PACIFIC OCEAN PERCH - PROXIMATE COMPOSITION

ABSTRACT

The Pacific ocean perch is a fishery resource that could be utilized commercially in Alaska if suitable markets can be developed. This fish has good organoleptic and cold-storage qualitites. The average proximate chemical composition of Pacific ocean perch fillets, as determined in the present study on 16 individual specimens, was 17.6 percent protein, 1.3 percent oil, 79.0 percent moisture, and 1.2 percent ash.

BACKGROUND

The Pacific ocean perch (Sebastodes alutus) is a species of the rockfish family that ranges from southern California to northwestern Alaska (figs. 1 and 2). It is a bright carmine-red on the dorsal surface and a lighter color on the ventral surface, with a silvery sheen. It has black markings on the dorsal surface and a long lower jaw (Clemens and Wilby 1954).

Fig. 1 - Catch predominantly of Pacific ocean perch.

This species of fish is taken to a limited extent by trawlers (figs. 3 and 4) in waters off Washington and Oregon. It is not utilized commercially from Alaskan waters, although exploratory fishing vessels of the U. S. Bureau of Commercial Fisheries have found Pacific ocean perch to be present in commercial quantities in Prince William Sound and in waters of southeastern Alaska. Schaefers, Smith, and Greenwood (1955), from observations aboard the Bureau's exploratory fishing vessel John N. Cobb, reported catches up to 6,000 pounds an hour in Prince William Sound and found the area generally to be favorable for dragging. Catches ranging up to 3,150 pounds an hour were made on the M/V Tordenskjold in waters off Prince of Wales Island, in southeastern Alaska, with little damage to gear.1/

The Pacific ocean perch has been compared with other species of rockfishes and has been found to have good organoleptic and cold-storage qualities (Stansby 1951). It has an initial palatability that is better than is that of other Pacific Coast rockfishes. The fillets do not have the disagreeable darker surface areas present in many of these species, and they maintain their good color, when properly stored, for a longer period of time than do most other rockfishes. The fillets have a storage

1/ Cruise Report. Exploratory Cruise No. 32, Chartered Vessel Tordenskjold, U. S. Bureau of Commercial Fisheries, October 18, 1957, unpublished.

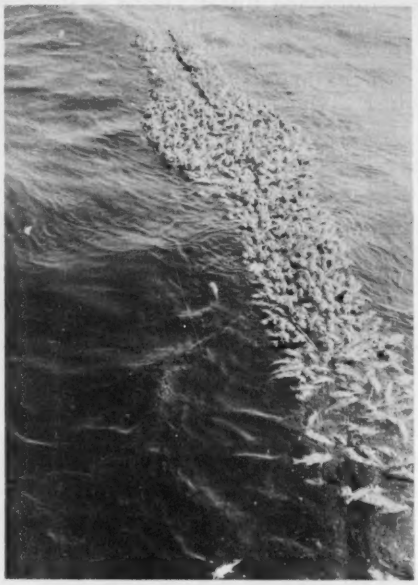

Fig. 2 - Catch of Pacific ocean perch in an otter-trawl net. These fish live on the floor of the ocean. Owing to the low pressure at the surface of the water in contrast to the high pressure at the depth they live, their air bladders expand markedly when they are brought to the surface, and they therefore gain considerable buoyancy. Fishermen call a catch of this type a "floater."

Fig. 3 - A trawler of the type that could be used in an Alaskan commercial fishery for Pacific ocean perch. Note the otter-trawl boards at the stem of the vessel.

Fig. 4 - View of otter trawler from the stern with a deckload of fish.

life of 8 months at 0° F. Their deterioration in cold storage presents no forseeable technological problem.

REPORT OF ANALYSES

Physical data, yield of fillets, and proximate composition (protein, oil, moisture, and ash) of 16 trawl-caught Pacific ocean perch are presented in table 1. Proximate composition was determined using standard techniques of the Association of Official Agricultural Chemists (1955). The fish were taken from two drags on June 29, 1957, by the M/V Tordenskjold, which was engaged in exploratory trawling in waters off the west coast of Prince of Wales Island. The fish in one drag (sample numbers 1-8) were larger than were those secured from the other drag (sample numbers 9-16). An inspection of the data, however, indicates that the chemical composition or yield of fillets in the group of larger fish differs little from that in the group of smaller fish. The average proximate chemical composition of the fillets of Pacific ocean perch described in this report was 17.6 percent protein, 1.3 percent oil, 79.0 percent moisture, and 1.2 percent ash. The average yield of

Table 1 - Proximate Chemical and Physical Composition and Fillet Yields of Pacific Ocean Perch (Sebastodes alutus) Taken in Two Drags Off Prince of Wales Island, Southeastern Alaska, on June 29, 1957

Sample	Length	Weight	Fillet Yield	Proximate Composition			
				Protein	Oil	Moisture	Ash
Number 1/	Inches	Pounds	(Percent)				
Drag A:							
1	12.5	1.4	29	17.6	1.41	78.0	1.24
2	13.0	1.5	30	17.8	0.93	78.0	1.13
3	13.5	2.1	31	16.3	0.69	79.6	1.15
4	13.0	1.9	27	15.1	0.97	79.1	1.13
5	13.0	1.8	30	16.6	2.20	78.5	1.09
6	12.0	1.5	29	17.8	1.36	78.0	1.08
7	13.0	1.9	26	18.2	1.14	78.8	1.08
8	12.0	1.7	27	18.6	2.86	76.9	1.14
Average	12.8	1.7	29	17.2	1.44	78.4	1.13
Drag B:							
9	9.0	0.7	29	17.7	0.77	82.2	1.26
10	9.0	0.8	27	18.4	1.17	79.1	1.17
11	10.0	0.9	30	18.4	1.21	79.0	1.19
12	9.0	0.8	27	18.2	1.41	79.1	1.25
13	10.0	0.9	29	18.5	1.35	79.6	1.20
14	9.0	0.7	31	18.4	0.86	80.4	1.12
15	9.5	0.7	30	18.1	1.35	79.9	1.15
16	9.0	0.7	30	16.0	1.38	79.4	1.32
Average	9.3	0.8	29	18.0	1.19	79.8	1.21
Average of two drags	11.0	1.3	29	17.6	1.32	79.0	1.17
Fillet waste from two drags				13.6	7.0	69.9	6.0

1/ Each sample number represents one fish.

fillets was 29 percent. The fillet waste contained 13.6 percent protein, 7.0 percent oil, 69.9 percent moisture, and 6.0 percent ash. The fish averaged 11 inches in length and 1.3 pounds in weight. Pacific ocean perch caught at another time of the year and from another geographic location, however, might differ somewhat in composition from those reported here.

--By John L. Iverson, Chemist,
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Fisheries Experimental Commission,
Ketchikan, Alaska

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CHLORINATED SEA WATER HELPS TO IMPROVE QUALITY OF FISH ABOARD FISHING VESSELS

The value of chlorinated sea-water in preserving the high quality of fish aboard fishing craft has been demonstrated by a series of tests in the North Atlantic trawl fishery. The experiments were conducted by the U. S. Bureau of Commercial Fisheries on a cooperating commercial fishing vessel. Equipment fabricated by the Bureau's Technological Research Laboratory in Boston was used in the tests.

It was found that fish washed in a spray of chlorinated sea water immediately after evisceration, and transported in holds which had been thoroughly washed by a similar solution, were cleaner and fresher than fish coming from trawlers using only ordinary sea water. The trawler using chlorinated sea water left port at the same time, fished the same waters, and returned at the same time as other fishing vessels; therefore comparisons between the old and the new techniques were readily made.

As a result of these findings owners of more than a dozen New England fishing vessels have evidenced an interest in installing chlorinating equipment.

According to Bureau staff members, the equipment is inexpensive and easily installed. It consists of a hypochlorinator metering pump and an electric motor. The chlorinated water from this assembly can readily be introduced into the existing "wash-down" system of the vessel.

The chlorine is provided by an eight-percent solution of sodium hypochlorite which is metered into the "wash-down" system at the rate of 50 to 80 parts per million parts of water for washing the holds and pen boards. By regulating the metering pump, a solution of 10 to 20 parts per million can be used in rinsing the eviserated fish.

Fish dealers who handled the fish from the experimental trip state that there were no detectable odors of decomposition in the body cavity of the fish, and that the fish were cleaner and fresher looking than those from other trawlers using the nonchlorinated sea water.

MEANING OF TERM "FISHING MORTALITY" USED BY FISHERY BIOLOGISTS

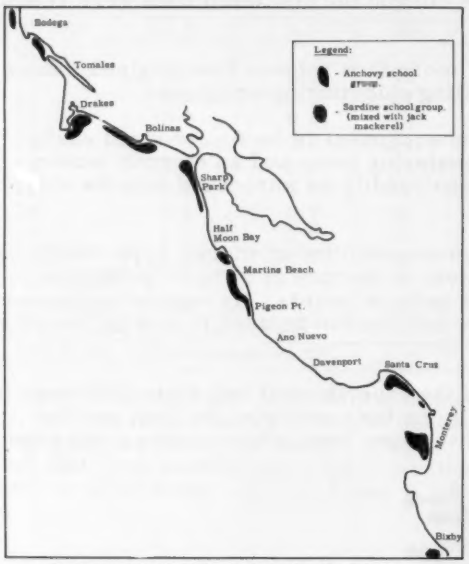
"Fishing mortality" as used in fishery biology means rate of death of fishes caused by fishing operations. It is used to distinguish this cause of death from "natural mortality" or death due to natural causes such as starvation, disease, or being eaten by other fish. The total rate at which animals die or a captured or "total mortality" must be determined in order to understand the dynamic changes taking place in the fish stocks. A knowledge of the rate of death by fishing, separated from the rate of death from "natural" causes, is often important for effective fishery management.

--"Sea Secrets," The Marine Laboratory, University of Miami

TRENDS AND DEVELOPMENTS

California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED (Airplane Spotting Flight 58-17): The inshore area between Pt. Sur and Fort Bragg was surveyed by the California Department of Fish and Game by airplane spotting flight 58-17 between September 10-13, 1958, to determine the number and locations of sport fishermen and pelagic fish schools in the area surveyed. Weather conditions were ideal for aerial spotting. Clear skies and very light or no winds were encountered throughout the four days of scouting. Shore and pier fishermen were tallied on each day of the flight. The procedure on this flight was to cover the entire area from Pt. Sur to Fort Bragg at least once for pelagic fish. This was accomplished by covering a portion of the coast for pelagic fish on each of the first three days. Part of the area--Monterey to Sharp Park--was surveyed for pelagic fish on two consecutive days.



Airplane spotting flight 58-17 (September 10-13, 1958).

Sport Fishermen: It was expected that with the end of the vacation season the tally of sport fishermen would be considerably less than on flights conducted during the vacation period. The week-day flights on September 10, 11, and 12 showed some decrease in sport fishing activity; however, on Saturday, September 13, large numbers of fishermen were tallied--between 5 to 6 times as many as on each of the three preceding days and comparable to the fishing intensity noted on week-end days during the vacation period.

Pelagic Fish: Anchovies continued to dominate the central California pelagic fish population. Large concentrations were observed in the northern section of Monterey Bay, between Martins Beach and Half Moon Bay, between San Francisco and Drakes Bay and off the Russian River. Again as on the previous flight (August 17-19, 1958) many of the anchovy schools were very large in size and irregular in shape, thus precluding the use of the tally of schools as a significant measure of the relative abundance of fish in comparison with the numbers of schools observed earlier in the year. In Monterey Bay, however, there were definitely fewer schools than on the last flight, and more anchovies were observed in the Martins Beach and Bolinas Bay areas.

Schools of jack mackerel and Pacific sardines were observed in Monterey Bay and off Pt. Sur. Some of the schools in Monterey appeared to be of pure sardines; however, most were of jack mackerel with some sardines. All the sardine-mackerel schools were small in size--maximum about 50 tons--and were located from the center of Monterey Bay extending into the shallow areas off Seaside and Fort Ord.

One white sea bass school was observed off Pt. Montara.

* * * * *

CONTAINERS TESTED FOR OCEANIC DISPOSAL OF RADIOACTIVE WASTE (N. B. Scofield Cruise 58-S-5-Waste Disposal): Five types of containers currently being used for the oceanic disposal of radioactive waste were tested (July 21-22, 1958) by biologists of the California Department of Fish and Game in waters 15 miles southwest of the Farallone Islands.

Duplicate units of each type of container were made and tested. No cases occurred where there was significant difference between the results from

CONSTRUCTION DETAILS

Copper tube pressure release is on the left.

Ice cream cartons held in place by battens.

Paint can with no vent.

PHOTOS SHOWING RESULTS

Exposed to 100 fathoms pressure.

Type D after descent to 400 fathoms

Type E showing damage at 400 fathoms.

the two sample containers prepared the same way. The basic container for all the tests was a steel drum of 55 gallons capacity. The sheet metal used was 18 gauge (.0418 inch). This type of package is the standard shipping container for lubricating oil and many industrial liquids. The barrels used by the waste disposal agencies in general come from the "war surplus" stock of the nearest military agency and are often dented and rusty.

Barrel A: This barrel was trash-filled and then sufficient fine gravel added to bring the total weight to 600 pounds. The lid was not sealed and six holes of $\frac{3}{16}$-inch diameter were punched in the sides.

Some waste disposal agencies have planned to use a lightly spring-loaded one-way valve to allow the entrance of sea water for pressure equalization.

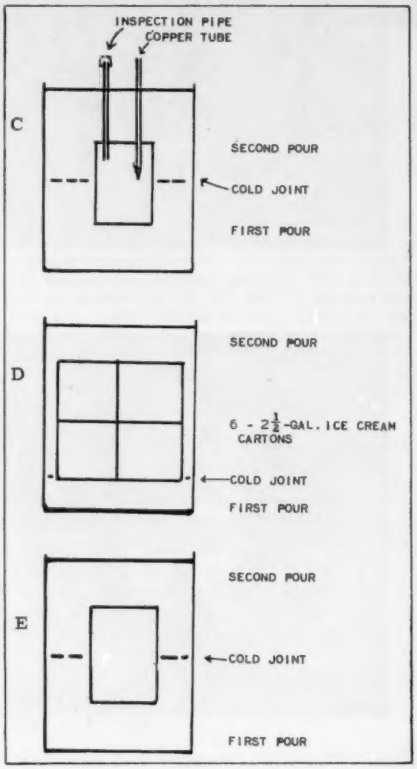
This barrel showed no damage when sunk to 100 fathoms. With the balancing of interior and exterior pressures there should be no damage to the steel container regardless of depth.

Barrel B: This was also trash-filled and ballasted to 600 pounds with gravel. Its lid, however, was fitted with a rubber gasket and bolted down watertight. With no pressure equalization this container collapsed to the point where the lid seal was broken. This bending-in occurred at less than 100 fathoms. After the air escapes and the water pressures inside and out become equalized no additional change would take place. None of the solid contents of the container was released.

Barrels C, D, and E all depend on concrete for integrity of their contents as the heads were cut out of the barrels. All concrete used was five sacks of cement to the cubic yard with $\frac{7}{8}$-inch maximum gravel. This represents a proportion of one part of cement to three of sand plus three-and-a-half of gravel. The mixing was done in a transit-mix truck. The first pour of concrete was cured in six days before adding the covering layer. The second pour was cured five days before testing. All cement embedded containers in the following tests were left void. As the encasing concrete will withstand a pressure of over 100 pounds per square inch, the presence or absence of compressible filler would not influence the results.

Barrel C: A five-gallon paint can was wired as possible. The space between the paint can and the drum was filled with concrete to a point halfway up the drum. The paint-can lid had two holes made in it so pipes could be inserted and extend upward to above the top of the drum. One tube was soft copper water pipe, $\frac{1}{2}$-inch diameter. The end inside the can was hammered flat and folded over. This was to act as a controlled pressure release inward, allowing the enclosed paint can to fill with enough sea water to equalize the pressures inside and outside. The second connection of the can to the exterior was a standard $\frac{3}{8}$-inch iron pipe capped on the exposed end. A flange was welded to this pipe to prevent seepage of water along the pipe or endwise movement due to water pressure. This tube was an inspection opening as water might slightly open the seal on the copper tube and enter without being evident from the exterior. Barrel C was subjected to pressure of over 1,000 pounds a square inch at 400 fathoms. The sealed copper tube burst as planned and no damage was sustained by the container.

Barrel D: This drum had concrete put in it to a depth of eight inches. After this layer in the bottom had hardened, 6 empty ice cream cartons of $2\frac{1}{2}$ gallons each were placed in the barrel as centrally as possible and fastened in place with wood battens. The remainder of void space was then filled with concrete. Barrel D went 400 fathoms deep. An obviously violent implosion crushed in the side. The metal of the drum was ruptured along two lines which could not happen if the water had leaked slowly into the void spaces through gradual cracking of the concrete and slow tearing of the steel.



Barrel E: This arrangement was the same as Barrel C with the five-gallon paint can enclosed in concrete. However, there was no connection between the enclosed paint can and the exterior. When this test unit was sunk to 400 fathoms the end collapsed with a cylindrical hole over the paint can equal in diameter to the can. The concrete was six inches thick over this area.

* * * * *

HALIBUT SURVEY OFF BAJA CALIFORNIA COAST (N. B. Scofield Cruise 58-S-6-Halibut): The coast of Baja California from the border to Cedros Island was surveyed (Sept. 6-22, 1958) by the California Department of Fish and Game research vessel N. B. Scofield to secure a large

M/V N. B. Scofield Cruise 58-S-6 (Sep. 6-22, 1958).

sample of California halibut for tagging purposes, morphometric studies, and length-weight-age studies. Other objectives were (1) to determine what physical and oceanographic conditions prevail in the areas where adult halibut, and their eggs and young are found; and (2) to test the efficiency and practicality of trawling gear in Mexican waters.

Sixty-one 15-minute hauls were made at various locations from just below the border to a point a few miles below Scammon Lagoon. In these hauls 216 sharks, skates, and rays were taken along with 284 bony fish. Halibut composed 60 percent of the catch of bony fish, fantail sole 13 percent, and diamond turbots 11 percent.

Approximately 170 halibut were taken in the trawl nets; 132 of these were tagged, the remainder preserved for routine laboratory examination.

Surface temperatures ranged from 73° F. to a low of 60° F. at San Quintin Bay. In general, surface temperatures averaged 70° F. in most areas.

It was found that favorable trawling conditions exist at the following locations:

(1) Mexican border to Rosario River in 8 to 14 fathoms.

(2) Todos Santos Bay from a point beginning two miles south of the Ensenada anchorage and extending an additional 5 miles southward in waters of 7 to 13 fathoms.

(3) Colnett Bay in water of 5 to 13 fathoms. Snags are located about 1 mile south and 1 mile off the Mesa Alta shoreline. Kelp patches appear in this vicinity.

(4) San Quintin Bay--entire bay area appears to be flat and clear. San Quintin shoreline composed of extensive shoals; a shallow draft vessel is necessary to work this portion.

(5) Falsa Bay--small bay, approximately 2 miles in length. Trawling conditions apparently favorable, as 4-15 minute hauls were made without snagging.

(6) Playa Maria Bay--heavy concentration of seaweed in 6 fathoms of water. Best trawling outside of this depth, and probably good inside under calm conditions.

(7) Sebastian Viscaino Bay--scattered trawling starting at Morro de Santo Domingo, the northern extremity of the bay, indicated that ideal trawling conditions existed over most if not all of the extensive shoreline.

(8) Black Warrior Lagoon--trawling possible in channel areas; however, slack tide is best because swift currents are constant during flood and ebb tides. Small vessels, or shallow draft vessels could operate in the side bays, or on flats adjacent to channels. Sting rays are very abundant in shallow areas.

Snags were encountered at (1) Colnett Bay; (2) Seven miles SE. of Punta Bunda--or 31°40' latitude, 116°40'15" longitude; and (3) Six miles SE. of Santo Domingo River, 2 miles offshore (30°37' 15" latitude, 116°4' longitude).

An excellent anchorage is available in Black Warrior Lagoon, but the entrance channel must be negotiated with caution.

* * * * *

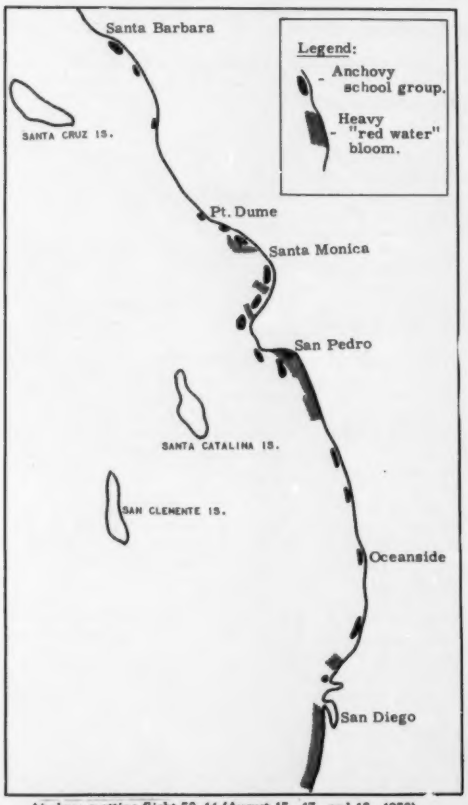
PELAGIC FISH DISTRIBUTION AND ABUNDANCE OFF SOUTHERN CALIFORNIA SURVEYED: Airplane Spotting Flight 58-14: The inshore area from the Mexican border to Point Conception was surveyed by the California Department of Fish and Game airplane spotting flight 58-14 between August 15-18, 1958, to determine the abundance and distribution of pelagic fish schools. Fair flying conditions prevailed on August 15 and 18, but low clouds and fog made it impossible to fly on the 17th.

PELAGIC FISH: In general, pelagic fish schools were not as plentiful as during preceding months.

Small school groups of anchovies were present from San Clemente to San Diego, and many large "breezing" schools of anchovies were seen off Los Angeles Harbor and in Santa Monica Bay. It was difficult to make an accurate count of these schools because they would alternately appear on the surface for varying periods of time and then disappear from sight. These schools were moving fast and changing shape rapidly, apparently being harrassed by bonito and/or barracuda which were reported to be heavily concentrated in the Los Angeles-Santa Monica area.

With the exception of one group of 40 schools of anchovies observed close to shore near Santa Barbara, no concentration of fish was apparent north of Point Dume.

The large "breezing" schools seen off southern California were positively identified as anchovies, and the other scattered schools observed during the flight were quite close to shore and exhibited characteristics and behavior very typical of anchovy schools.



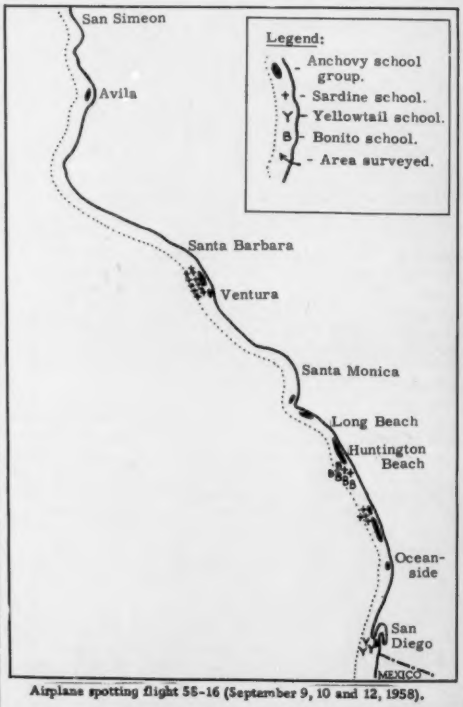
Airplane spotting flight 58-14 (August 15, 17, and 18, 1958).

During the August 15 flight, a total of 258 anchovy schools were sighted; on August 18, a total of 309 anchovy schools were sighted.

RED TIDE: The "red tide" which has persisted in southern California throughout most of the summer was still in evidence in some areas. Very heavy plankton "blooms," rusty-red in color, were present in Los Angeles-Long Beach Harbor, off Huntington Beach, La Jolla, and the Coronado Strand. The water in Santa Monica Bay was generally dirty with a few patches of red dinoflagellates. No heavy "red tide" was in evidence north of Point Dume.

The Los Angeles-Long Beach Harbor breakwater system had a definite confining effect on the organisms causing the red water. The entire harbor area from the shoreline to the outer harbor breakwaters was the color of "tomato soup." This discoloration stopped abruptly at the breakwaters and extended seaward only a short distance through the two channel openings and the open southeast end of the harbor.

Airplane Spotting Flight 58-16: The inshore area from San Diego to San Simeon was surveyed (Sept. 9-12, 1958) from the air by the California Department of Fish and Game Cessna "170" 1359D to determine the distribution and abundance of pelagic fish schools and to assess the intensity of



Airplane spotting flight 58-16 (September 9, 10 and 12, 1958).

shoreline fishing and clamming activity. Atmospheric conditions were generally favorable for aerial spotting during the three-day period of the survey.

PELAGIC FISH: No heavy concentration of anchovy or sardine schools was in evidence within the range of the flight, although moderate amounts of anchovies were present off San Onofre (200 schools), Huntington Beach (225 schools), Pitas Point (60 schools), and Avila (71 schools). In all four of the above areas, the schools were close to shore and motionless. Individuals within these schools seemed to be well dispersed and the schools were thin and ragged.

Seventy large, deep-swimming schools were seen during the three days, but species identification was not possible. Three schools of yellowtail were noted one to two miles off the Coronado Strand and about 10 schools of bonito were sighted between Laguna and the Newport breakwater.

WATER CONDITIONS: "Red tide" was present south of Point Dume, with a particularly heavy outbreak observed between Redondo Beach and Malibu. Although reduced in intensity compared to August observations, red water still prevailed from Los Angeles-Long Beach Harbor to Newport Beach. Other areas of the coast were free from heavy concentrations of red water.

SHORELINE AND PIER SURVEY: A count of fishermen on piers and beaches and beach clammers was made from San Simeon to Point Arguello. As compared to earlier summer months, very little fishing activity was observed.

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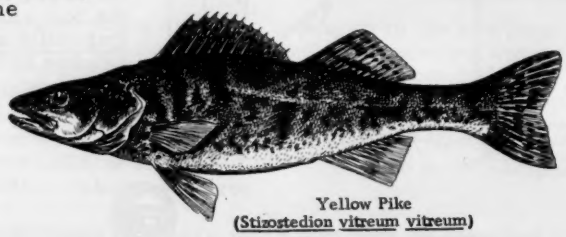
STOCKING OF STATE WATERS WITH YELLOW PIKE UNDER CONSIDERATION: A request to experiment with the introduction of fresh-water yellow pike (walleye) to two reservoirs in San Diego County was one of the highlights of a varied agenda at an October 23, 1958 meeting of the California Fish and Game Commission.

The yellow pike or walleye, the largest member of the perch family, is common in the Great Lakes and other eastern lakes. It ranges between 14-20 inches in length and occasionally reaches a length of 30 inches



Yellow Pike
(Stizostedion vitreum vitreum)

The California Department of Fish and Game asked the Commission to approve the experimental introduction of yellow pike into San Vicente and El Capitan Reservoirs. The proposed project is to obtain eggs from the eastern lakes, fly them to California, and rear the fish to a size of $1\frac{1}{2}$ to 2 inches in southern California ponds. The Department says there is some doubt that yellow pike will reproduce in San Diego reservoirs, but explains there is no way of knowing for sure until they have been stocked.

The purpose of the experiment is to introduce a new predatory game fish that will prey upon small bluegills and threadfin shad, which are abundant in these reservoirs. The Department hopes the yellow pike will not only provide an additional fish to catch but will also reduce the numbers of bluegill enough to enable them to increase in size and thereby become a more desirable fish.

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YELLOWFIN AND SKIPJACK TUNA TAGGED ALONG BAJA CALIFORNIA COAST (M/V Cape Beverly Cruise 58-C-2-Tuna): Fishing was conducted (July 5-September 8, 1958) along the outer coast of Baja California by biologists of the California Department of Fish and Game aboard the commercial tuna fishing vessel Cape Beverly. The purpose of this cruise was to tag yellowfin and skipjack tuna as part of population, growth, and migration studies; to collect and identify marine organisms associated with the tuna fishery; and to make limited oceanographic observations.

Tuna-tagging cruise (58-C-2-Tuna), July 5, 1958-September 8, 1958.

A total of 1,399 yellowfin and skipjack tuna were tagged with Type G, yellow, spaghetti tags and released off the Baja California coast.

The yellowfin tuna (450) were measured to the nearest one-half centimeter. Because the skipjack (949) unless returned to the water immediately suffer a heavy mortality rate, they were not measured. Six tagged yellowfin and seven skipjack had been captured and returned to the California State Fisheries Laboratory by other vessels prior to the return of the tagging team.

Marine organisms were collected at 21 different stations. Sea surface temperatures were taken at bait and fishing stations. Bait hauls were made in temperatures ranging from 62.3° to 70.1° F. The most successful hauls were made in the lower temperature ranges. Most of the bait consisted of northern anchovies, Engraulis mordax. The most successful catches of tuna were obtained in temperatures ranging from 72.1° to 78.6° F.

Cans--Shipments for Fishery Products, January-August 1958

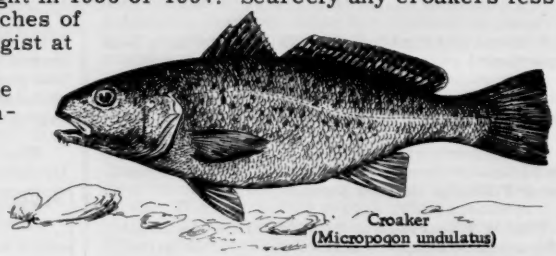
Total shipments of metal cans during January-August 1958 amounted to 78,678 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 86,130 tons in the first eight months of 1957. Fish canning operations in August were about at an annual peak for salmon, Maine sardines, and tuna. The California sardine fishing season opened on August 1, and a pack twice that of 1957 was assured.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Croakers

SCARCITY IN CHESAPEAKE BAY PREDICTED: Recent observations made by fishery biologists of the Virginia Fisheries Laboratory at Gloucester Point indicate that croakers will be scarce in Virginia for the next year or two. These scientists have been making extensive studies of croakers in Chesapeake Bay and York River since 1950.

"During 1958 trawl samples taken from the research vessel Pathfinder and samples collected from pound-net catches contained a larger percentage of older and larger croakers than were caught in 1956 or 1957. Scarcely any croakers less than a year old were present in catches of either gear," states a fishery biologist at the Laboratory. He also says that young croakers which hatched in the fall and winter of 1957 should normally be abundant in samples now. "Pinheads" (croakers about 4-6 inches long) return to the Bay after a winter in the Atlantic and often make up a large part of the catch the following summer.



Croaker
(Micropogon undulatus)

Believing that abundance of young croakers in the rivers would be an indication of the expected number of fish available to sport and commercial fishermen in later seasons, the biologists have been sampling young fish at 16 different stations from the mouth of Chesapeake Bay up into the fresh water of the Paumunkey River each month since April 1956. Prior to that time a staff biologist did extensive sampling over the same range.

In August 1958 large numbers of young croakers appeared in the samples. This was unusually early for them to be in the Bay and showed that spawning was unusually good. They were present in monthly samples through December 1957, but in January 1958 there was a serious decline in numbers and in April 1958 no young croakers were taken at all. In years prior to 1958 young-of-the-year croakers were not abundant before October, but were found throughout the York River all winter and the following spring. In May 1957, over 2,000 fish were taken in 16 samples, whereas, in May of 1958 only one croaker was taken.

The sudden disappearance of young croakers which had been so abundant in the fall of 1957 suggests that some catastrophe occurred in January 1958. Excessively cold water may have killed most of the young. The biologist reports that during the winter of 1957/58 water temperatures were lower and remained so for unusually long periods of time. Lowest temperatures recorded during the past winter were 36° F. in January and 34° F. in February. The lowest temperatures recorded for those two months prior to 1958 were 39° F. and 46° F.

Croakers spawn off Chesapeake Bay late in summer and continue spawning until early spring. It has been found that soon after spawning the young fish migrate up into the upper reaches of the river where they live during winter, spring, and summer. By the end of the first summer "pinhead" croakers migrating to the ocean are caught in pound nets. When they return to the Bay the following spring, they make up a large part of the commercial catch.

Fishery biologists believe that the success of the croaker fishery depends in large part on conditions prevailing in tributaries of Chesapeake Bay. Unfavorable temperatures, lack of food, diseases, or pollution may destroy large numbers of young. When nursery area conditions are at their best, large numbers of young survive, bringing good catches a year or two later.

Federal Aid Funds for Sport Fish and Wildlife Restoration Apportioned to States for Fiscal Year 1959

Federal Aid funds totaling $21 million have been apportioned to the States for their fish and game restoration programs for the year ending June 30, 1959, Assistant Secretary of the Interior Ross Lefler announced on November 2, 1958.

The Federal Aid program is administered by the Bureau of Sport Fisheries and Wildlife, United States Fish and Wildlife Service.

This is a decrease of $306,000 from the fiscal 1958 apportionment--a loss of $574,000 on game restoration and a gain of $268,000 for the restoration of fish. Game restoration funds for fiscal 1959 amount to $16.4 million; fish restoration funds, $4.6 million.

With this announcement came the Assistant Secretary's comment that in the apportionment to be made next year Alaska, as a State, will receive approximately $1 million as compared with the annual $165,000 it has been receiving as a Territory, a condition which will affect amounts to be distributed to individual states.

The Assistant Secretary pointed out also that the $21 million apportioned this year includes the fourth of five "backlog" allotments of $2,693,494 each. After the apportionment for 1960 this backlog money will have been distributed and the total amount available will be affected accordingly.

Federal Aid funds are derived from Federal excise taxes collected from the manufacturers--an 11-percent tax on sporting guns and ammunition for the restoration of game (Pittman-Robertson Act, approved September 2, 1937) and a 10-percent tax on fishing rods, reels, creels, and artificial lures, baits and flies (Dingell-Johnson Act, approved August 9, 1950).

The formulas upon which Federal Aid funds are distributed are prescribed by law and are based upon area and license holders. In the distribution of game restoration money, half of the amount is apportioned on the ratio of land area of a state to total area of all the states and half on the ratio of license holders. For fish restoration, land and water area is used for the distribution of 40 percent of the funds and 60 percent on license holders.

Maximum apportionment for each program is five percent of the total; minimums are one-half percent for game restoration and one percent for fish restoration.

In the 1959 distribution Texas and Michigan received maximum amounts for the restoration of game, $820,000 as compared with $848,700 which each received as maximum payments for fiscal 1958. California received $230,000, the maximum for restoration of fish, compared with the $216,600 it received in fiscal 1958. Minnesota, which received the maximum amount last year fell short of that goal in the 1959 distribution because its sales of fishing licenses did not increase to the same degree that sales did in several other states.

The minimum amount for game restoration for fiscal 1959 is $82,000, received by New Hampshire, Rhode Island, Connecticut, Delaware, Vermont, and Hawaii. In 1958 the minimum was $84,870. For fish restoration the minimum for 1959 is $46,000 ($43,320 in 1958) and was received by Con-

Apportionments of Federal Aid Funds to States for Sport Fish and Wildlife Restoration, Fiscal Year 1959

State	Sport Fishing	Wildlife
Alabama	$93,564.96	$294,312.60
Arizona	87,034.28	364,661.69
Arkansas	84,781.79	272,938.96
California	230,000.00	790,109.55
Colorado	105,618.57	436,366.14
Connecticut	46,000.00	82,000.00
Delaware	46,000.00	82,000.00
Florida	103,746.68	234,066.25
Georgia	91,363.77	268,940.64
Idaho	75,250.42	314,351.29
Illinois	147,339.34	456,468.32
Indiana	138,546.15	467,647.50
Iowa	84,192.81	363,288.85
Kansas	74,208.16	314,369.67
Kentucky	79,852.75	261,040.76
Louisiana	58,656.23	287,877.55
Maine	51,135.33	184,600.48
Maryland	46,000.00	112,772.63
Massachusetts	46,000.00	89,309.10
Michigan	209,575.76	820,000.00
Minnesota	221,163.25	528,593.75
Mississippi	53,362.20	239,443.84
Missouri	118,945.08	395,325.02
Montana	113,430.45	505,016.19
Nebraska	68,673.04	296,991.01
Nevada	67,715.81	317,059.03
New Hampshire	46,000.00	82,000.00
New Jersey	46,000.00	118,464.51
New Mexico	80,263.28	374,826.46
New York	145,847.54	695,907.06
North Carolina	84,223.59	339,779.61
North Dakota	48,588.95	250,404.53
Ohio	152,097.30	516,203.15
Oklahoma	92,294.82	284,221.35
Oregon	103,056.95	409,090.48
Pennsylvania	125,814.03	636,909.81
Rhode Island	46,000.00	82,000.00
South Carolina	54,509.59	174,101.39
South Dakota	59,244.37	295,569.58
Tennessee	114,702.57	338,451.29
Texas	207,027.78	820,000.00
Utah	69,482.47	319,329.75
Vermont	46,000.00	82,000.00
Virginia	77,320.23	327,671.34
Washington	94,074.96	338,035.45
West Virginia	46,000.00	219,196.71
Wisconsin	196,183.02	508,281.47
Wyoming	77,111.72	326,006.24
Hawaii	46,000.00	82,000.00

necticut, Delaware, Maryland, New Hampshire, Massachusetts, New Jersey, Rhode Island, Vermont, West Virginia, and Hawaii. These same states received the minimum amounts for 1958.

Guam (which became eligible for Federal Aid in 1958), Puerto Rico, and the Virgin Islands each received $12,000 for game restoration programs and $10,000 each for fish restoration. Alaska has been receiving a statutory $90,000 for game programs and $75,000 for fish work. Hawaii has been receiving its funds on the regular State formula because of congressional action, July 2, 1956.

Federal Aid money must be matched by state money on the basis of $3 Federal Aid to $1 state funds, although in actual practice the states carry out all projects with their own funds, and are reimbursed for up to 75 percent of project costs.

To obtain the benefits of the Federal grants, the states submit project proposals to the Bureau of Sport Fisheries and Wildlife. Such proposals may consist of surveys, investigations, land acquisitions, land and water development, management of restoration areas, and maintenance of the completed projects. Acting for the Secretary of the Interior, the Bureau reviews these proposals to determine whether they are substantial in character and design, within the meaning of the Acts.

When Federal Aid projects are approved by the Bureau, the state fish and game departments proceed to carry out the plans, spending their own funds. The states then submit reimbursement claims for 75 percent of the costs of the project, either periodically or at the completion of the work. All equipment, lands, and structures become the property of the states. All project workers are hired by the states and are state employees.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-SEPTEMBER 1958: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.7 million pounds of fresh and frozen fishery products were bought in September by the Military Subsistence Market Centers--3.8 percent more than the preceding month and 4.3 percent more than in September 1957.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, September 1958 with Comparisons

QUANTITY			
June		Jan.-Sept.	
1958	1957	1958	1957
(1,000 Lbs.)			
1,679	1,610	17,875	18,715

For the first nine months of 1958 purchases of fresh and frozen fishery products totaled 17.9 million pounds, 4.5 percent less than in the same month of 1957.

Canned Fishery Products: Tuna was about the only canned fishery product bought for the use of the Armed Forces during September 1958. For the first nine months of 1958 canned fish purchases were about 5.4 million pounds--92.3 percent more than the same period of 1957. Purchases of canned tuna were up 166.3 percent for January-September 1958 as compared with the first nine months of 1957.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, September 1958 with Comparisons

Product	QUANTITY			
	June		Jan.-Sept.	
	1958	1957	1958	1957
	(1,000 Lbs.)			
Tuna	461	-	3,931	1,476
Salmon	1	211	1,402	1,220
Sardines	-	18	93	125

Fisheries Loan Fund

LOANS THROUGH OCTOBER 20, 1958: As of October 20, 1958, a total of 482 applications for fisheries loans totaling $17,228,290 had been received. Of these 260 ($6,924,252) were approved, 163 ($4,923,938) were declined, 36 ($1,564,126) were withdrawn, and 23 ($2,914,514) are pending. As several of the pending cases

have been deferred indefinitely at the request of the applicants and collections have been increasing, sufficient funds have been available to process all other applications when received. Funds are expected to be available to assure prompt handling of new applications.

The following loans have been approved between September 8, 1958, and October 20, 1958:

New England Area: Lester Falkingham, Beals, Me., $3,000; Boat Sea Ranger, New Bedford, Mass., $12,556; Nils Risdal, Fairhaven, Mass., $78,000.

South Atlantic and Gulf Area: Wendell H. McGill, Naples, Fla., $32,000; Isaac Daigle, Morgan City, La., $18,000.

California: American Tunaboat Association, San Diego, $100,000; Frank M. Perry, San Diego, $160,000.

Pacific Northwest: George T. Moskovita, Astoria, Oreg., $36,000.

Fishery Research Laboratory

NEW SHELLFISH LABORATORY TO BE BUILT ON CHESAPEAKE BAY: A new Federal shellfish research laboratory will be built at Oxford, Md., the U. S. Department of the Interior announced on October 2, 1958.

The site was selected by Interior's Bureau of Commercial Fisheries, after inspection of nearly 50 possible sites along the eastern shores of Chesapeake Bay. The site of about 13 acres was donated by Arthur J. Grymes, Jr., owner and manager of Tidewater Inn at Easton, Md. It is located on the outskirts of Oxford on Bachelor's Point at the junction of the Tred Avon and Choptank Rivers. The site has a 400-foot frontage on the Tred Avon River.

The initial projects of the laboratory will relate to oysters and soft-shell clams. The oyster projects will include work on the artificial propagation of that shellfish, causes for mortality, and a search for improved methods of obtaining seed oysters. The laboratory will consist of a building with the equipment necessary for the projects and several ponds which will be used in the study of oyster culture. Any research vessels attached to the laboratory will utilize a boat basin which will be dredged from the Tred Avon River.

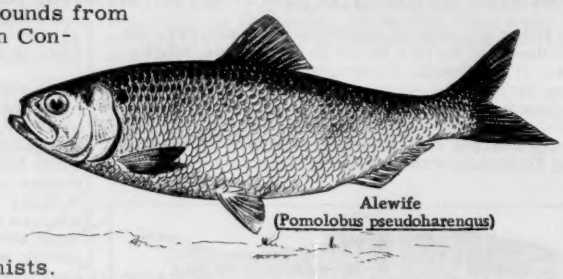
The site was selected because it was found that the salinity of the water there was right for oyster culture, the water was clean with no indications of pollution in the future, and there are few or no predators. The oyster drill and the starfish, master enemies of the oyster, are lacking entirely because of the brackishness of the water. A six-inch fresh-water line is on the edge of the property and electricity for lights and power is available.

Congress has made an initial appropriation of $180,000 for the construction of the laboratory. Work on the plans is proceeding and bids will be called for as soon as possible.

Great Lakes

INCREASE IN ALEWIFE POPULATION RAISES PROBLEMS: The sharp increase of alewife (Pomolobus pseudoharengus) in Lake Michigan and Lake Huron prompts the question: Is this the sign of a biological explosion?

Four years ago no mention was made of the alewife in Michigan statistical records. In 1957, 33,625 pounds of this so-called nuisance fish were taken from Lake Michigan and an additional 1,868 pounds from Lake Huron, according to Michigan Conservation Department reports.



Alewife
(Pomolobus pseudoharengus)

A member of the herring family, the alewife came to the Great Lakes from salt water. To date it has little commercial value and its alarming increase in Michigan's waters is causing considerable concern among fishermen and conservationists. Not only is the fish a nuisance in the nets of the fishermen, but it seems to be taking the place of the valuable lake herring. As the alewife increases, the herring seems to decrease in almost the same proportion.

Concern is also being expressed over the presence in Lake Huron of the gizzard shad (Dorosoma cepedianum), another salt-water newcomer and another member of the herring family. Although the increase of the gizzard shad is not spectacular, its presence troubles fish biologists.

Great Lakes Fishery Investigations

SURVEY OF WESTERN LAKE ERIE FISH POPULATIONS CONTINUED BY M/V "CISCO:" Cruise 9: Trawling was continued during the September 9-22, 1958, cruise of the U. S. Bureau of Commercial Fisheries research vessel Cisco in 9 areas in the western basin of Lake Erie and one area in the central basin off Lorain, Ohio. Adult yellow perch and sheepshead continued to predominate among the larger fish in the catches. Young-of-the-year yellow perch, alewife, gizzard shad, sheepshead, and white bass were common to abundant in most of the catches. The young fish had attained the following approximate average total lengths in western Lake Erie: yellow perch, 3.7 inches; alewife, 3.9 inches; gizzard shad, 4.0 inches; sheepshead, 3.8 inches; and white bass, 3.2 inches. The latter two species, however, had wide length ranges. Smelt fry averaged about 2.6 inches. Other species taken commonly were carp, emerald shiner, spottail shiner, and trout-perch. Caught only occasionally were mooneye (only 1), adult smelt, white sucker, goldfish, silver chub, channel catfish (one large catch near South Bass Island), brown bullhead, stonecat, burbot, white bass adults, walleye (yellow pike), logperch, and fry of white crappie and black crappie.

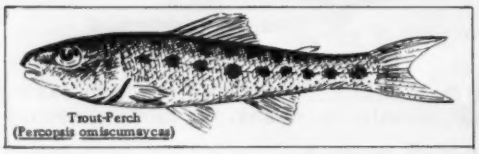
Emerald Shiner
(Notropis atherinoides)

Of special interest were changes in fish stocks and environmental conditions at the station off Lorain in the central basin. During the previous several cruises there has been a sharp thermocline just off the 10-fathom bottom with a scarcity of oxygen below the thermocline. Fish catches have been extremely small, consisting only of a few smelt, yellow perch, and sheepshead. When the station was visited during this cruise, however, the thermocline was not present, oxygen was plentiful at the bottom, and perch and fry of white bass and alewives were taken in very large numbers. Smaller quantities of several other species were also taken.

In a special study to obtain information regarding time of feeding of yellow perch, sheepshead, spottail shiners, and trout-perch, trawl hauls were made east of South Bass Island at 8:30 a.m., 12:00 noon, 3:30 p.m., and 10:00 p.m. The spottail shiners and trout-perch were preserved for future examination, but the yellow perch and sheepshead stomachs were examined aboard the Cisco. The percentage of stomachs of yellow perch older than

yearlings containing food at the various times were as follows: 8:30 a.m., 47 percent; 12:00 noon, 68 percent; 3:30 p.m., 54 percent; 10:00 p. m. 9 percent; indicating that during the study period the yellow perch fed mostly during the morning. The same was true of yearling yellow perch, but to a lesser degree. Most all young-of-the-year yellow perch had full stomachs in all collections. No definite changes were noted in the sheepshead stomachs.

Nylon gill nets of several mesh sizes were set southeast of Kelly's Island in 6½ fathoms, southwest of the Detroit River Light in 3 fathoms, and just north of the Monroe entrance channel in 3 fathoms. All nets were "canned" so that their float lines were 6 feet below the surface. The catch off Kelly's Island was largely gizzard shad (61 weighing 50 pounds with 300 feet of 2¼-inch mesh). Three



Trout-Perch
(Percopsis omiscumaycus)

yellow pike (walleyes) and little else were taken off the Detroit River Light. The set off Monroe, which contained 600 feet each of 2½- and 3½-inch mesh, caught 80 perch, 17 yellow pike (walleyes), 31 carp, 22 gizzard shad, and a few sheepshead, alewives, goldfish, and channel catfish.

Shore-seining operations were carried out in one area near Sandusky, Ohio, and two areas near Monroe, Mich. Catches consisted mostly of young of the year of several species.

The water in Lake Erie continued to cool very slowly. Surface temperatures ranged from 18.4°-21.3° C. (65.1°-70.3° F.). There was no thermal stratification at any location visited.

Cruise 10: Trawling at the regular stations in western Lake Erie was continued during the September 30-October 13, 1958, cruise. Four of the areas designated as "index stations" were fished with trawls by the U. S. Bureau of Commercial Fisheries research vessels Cisco and Musky, and a 16-foot boat equipped with outboard motor, the latter confined to very shallow water. These areas, which are southwest of the Detroit River Light, southeast of the Toledo Harbor Light, east of Cedar Point, Ohio, and east of South Bass Island, have been worked in the same manner by the three boats twice previously this year. They will be worked systematically in future years in an attempt to gain enough information to follow annual fluctuations in fish stocks.

Trawl catches contained fewer adult sheepshead and young-of-the-year white bass and more adult smelt than similar catches made during the previous cruise. Apparently, the sheepshead and white bass have dispersed rather widely into the deeper portions of the lake. The smelt have begun to move westward into the cooling water of the western basin but not yet in large numbers. The most abundant species were yellow perch, emerald shiner, spottail shiner, trout-perch, and young-of-the-year sheepshead and alewife. Gizzard shad, smelt fry, white suckers, carp, goldfish, silver chub, channel catfish, brown bullhead, yellow pike (walleye), logperch, black crappie fry, and white crappie fry were less common. Single northern redhorse, stonecat, sauger, and rock bass fry were also captured.

Experimental nylon gill nets were set in 3 fathoms of water southwest of the Detroit River Light and 2½ fathoms north of the Monroe entrance channel. The nets were "canned" so that their float lines were six feet below the surface. The catch was predominately yellow perch in the net off Monroe, 254 being taken in one 300-foot section of 2½-inch mesh. In the set near the Detroit River Light the catch was largely young-of-the-year gizzard shad, taken mostly in the 2-inch mesh. Eleven walleyes (yellow pike) were taken in the two sets.

The water in western Lake Erie had cooled appreciably since the previous cruise, with the coldest recorded around river mouths. The temperature range was 13.0°-18.6° C. (55.4°-68.5° F.). No thermal stratification was observed.

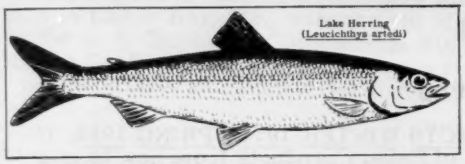
* * * * *

WESTERN LAKE SUPERIOR HERRING AND GENERAL FISHERY SURVEY CONTINUED (M/V Siscowet Cruise 6): The fishery and environmental study of Western Lake Superior was continued in the Apostle Island area by the U. S. Bureau of Commercial Fisheries research vessel Siscowet during cruise 6 (September 15-24, 1958). Six stations were visited during the cruise: (1) southeast of Michigan Island, (2) northwest of Madeline Island, (3) northwest of Sand Island, (4) south of Sand Island, (5) southeast of Madeline Island, and (6) northwest of Michigan Island. Sweeps were made with a special fish-magnifying fathometer at each station in an attempt to locate schools of lake herring. When a school of fish appeared on the fathometer, a gill net was set obliquely from the surface to the bottom. Bull nets 300 by 20 feet with 2⅜- and 2½-inch mesh were used. Plankton samples were collected at each station and trawling was done where possible.

Catches in trawl hauls were generally muddlers, ninespine sticklebacks, and young-of-the-year smelt. One 15-minute tow northwest of Sand Island in 30 fathoms took 94 chubs. Extensive trawling with the outboard-motorboat rig was conducted just south of Sand Island, where the water is extremely shallow (3-13 feet), and it was hoped that young-of-the-year lake herring or possibly whitefish could be captured. Results were negative--a few muddlers and johnny darters made up the entire catch. No lake herring were taken with the trawl during cruise 6.

Lake herring were taken in abundance with the bull nets southeast of Michigan Island and south-

Chubs and smelt were predominant in the set made northwest of Sand Island, with lesser catches of burbot and only 10 herring. The set northwest of Madeline Island was made to identify a large school



east of Madeline Island. These fish averaged 13 inches in length and nearly 10 ounces in weight. Other species taken in these nets were longnose suckers, burbot, smelt, lake trout, and chubs. of fish which appeared on the fish-magnifying fathometer. One 300-foot conventional gill net (2½-inch mesh) took 78 longnose suckers weighing 8[illegible] pounds.

The set northwest of Michigan Island was again made to identify large schools of fish which appeared on the fathometer. Five bull nets were set on the bottom which varied in depth from 36 to 150 feet. The catch was predominately longnose suckers (226 fish weighing 259 pounds) and burbot (64 fish weighing 29 pounds). Other fish taken were herring (14), smelt (43), menominee whitefish (13), and lake trout (5).

Surface temperatures ranged from 54.5° F. at the station northwest of Madeline to 59.0° F. southeast of Madeline. Bottom temperatures remained at about 40° F.

Inspection for Fishery Products

U. S. BUREAU OF COMMERCIAL FISHERIES PROGRAM IN FULL SWING: It is estimated that an average of over one-third million pounds of fishery products a day is produced under the continuous inspection of Government fishery inspectors supplied by the U. S. Bureau of Commercial Fisheries. The inspection staff is combining the grading and inspection experience of the Agricultural Marketing Service (A. M. S.) and the commercial fisheries experience of the Bureau of Commercial Fisheries. When the latter Bureau assumed responsibility for the fishery inspection services on July 1 of this year, it took over several experienced agricultural fishery plant inspectors. Furthermore, the A. M. S. officials have been quite helpful with advice and suggestions based on their years of grading and inspecting food products.

The Bureau of Commercial Fisheries inspection service now has 20 inspectors and 2 field supervisors; another supervisor is to be added in the near future. Sixteen seafood processing plants are now operating under the continuous inspection of Bureau personnel. Essentially all of the production of these plants can now bear the certification that it was "produced under continuous government inspection" and satisfied the requirements of the inspection service. Furthermore, most of the breaded shrimp, fish sticks, and fish blocks produced can also bear the official "U. S. Grade A" or "U. S. Grade B" shields. Only three products can now use the grade shields because so far there are only three official grade standards for fishery products. The Government and industry are now working actively to develop additional standards. Two, those for haddock fillets and halibut steaks, may be official by the first of next year. Although only three products are now graded, something like 75 different fishery products are prepared under continuous inspection.

In addition to the 16 plants having continuous inspection, another 15 or 20 firms have on one or more occasions employed the Government inspectors to inspect and grade specific lots of fishery products. Although the packages in these lots can not be imprinted with a "U. S. Grade" shield or with a "continuously inspected" shield, they can indicate that they have been lot-graded and certificates covering the inspection and grading results can be supplied buyers and sellers.

Maine Sardines

STUDY INDICATES SALES EXCEED IMPORTED BY A WIDE MARGIN: Sardines canned in Maine are currently outselling imported brands by a ratio of 8 cans to 2 and the California type by 8 cans to 1 in the United States market, according to survey data released by the Maine Sardine Council on October 17, 1958. The survey was made by a national research organization employed by the Council.

The survey also revealed that Maine has 68 percent of the market in can volume as compared with 21 percent for imported packs and 11 percent for the California sardine.

The Maine industry's sales had been showing a steady gain for the past 12 months and much of this was attributed to the mandatory State-grading program which went into effect at the start of the present season. Voluntary grading had been in operation for the previous three years and this has also been a major factor.

The grading program is under the direction of the Maine State Department of Agriculture and is designed to improve the over-all quality and merchandising of the State's sardine pack

Marketing

EDIBLE FISHERY PRODUCTS PROSPECTS WINTER 1958-SPRING 1959: United States civilian per capita consumption of fishery products from now to mid-spring 1959 is expected to be a little above the year-earlier rate. The prospective increase will be in the canned items; use of the fresh and frozen products will likely differ little. Retail prices of fishery products may be close to those of a year earlier, though some easing in prices of canned fish could occur because of heavier supplies.

Prospects are for somewhat more edible fishery products to be available from fall to spring this season than last. Supplies of frozen fishery products in the continental United States are expected to be about the same as a year earlier, but those of the fresh products will be seasonally low until the new catch season begins next spring. More canned fishery products than a year ago will be available in the next several months because of the larger packs of salmon, tuna, and sardines. Output of canned tuna may set a record this year. The pack of California sardines (pilchards) may be the largest in several years, but that of Maine sardines is smaller than in 1957. As usual, imports will supplement domestic production of canned fishery products, though maybe not to the extent that they did in the past year.

Exports of fishery products during the next several months may be somewhat greater than a year ago. Canned salmon and California sardines are the major items among the fishery products we usually export, and our supplies of these two items will be larger in the months ahead. The United Kingdom recently removed restrictions on imports of canned salmon from the United States and Canada. The restrictions had been imposed in the late 1940's to conserve dollar resources.

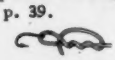
This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's November 5, 1958, release of The National Food Situation (NFS-86).

North Atlantic Fisheries and Gear Research

EXPLORATORY TRAWLING FOR COMMERCIAL QUANTITIES OF SAND LAUNCE CONTINUED (M/V Delaware Cruise 58-6): In order to find out about the commercial potential of sand launce (sand eel), the second in a series of cruises off the New England coast was made October 22-30, 1958, by the exploratory fishing vessel Delaware of the U. S. Bureau of Commercial Fisheries. The commercial potential for industrial fishing on this species in the New England area is unknown at the present time, though an extensive fishery exists for this species in the North Sea.

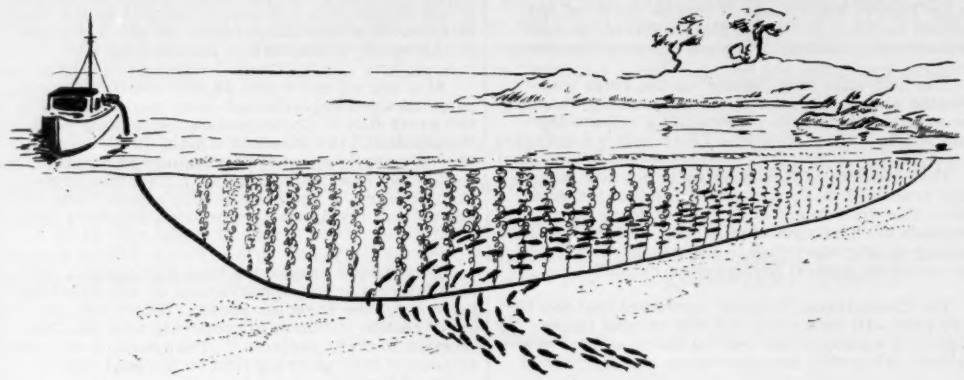
Experimental trawling was conducted in cooperation with local fishermen in the Point Judith, R. I., area. Coordinated trawling between the Delaware and a commercial trawler was done, each vessel being equipped with a 100-foot Holland sand launce trawl of a type identical to that now being used in Europe.

Note: See Commercial Fisheries Review, August 1958 p. 39.



North Atlantic Herring Research

AIR-BUBBLE CURTAIN DIRECTS SARDINES INTO SEINE SUCCESSFULLY: Promising seine catches of sardines (herring), were made by commercial fishermen in Casco Bay, Me., with the aid of the compressed air-bubble curtain developed by the U. S. Bureau of Commercial Fisheries North Atlantic Herring Research Station at Boothbay Harbor. Tests were first conducted on the air-bubble curtain in



Air-bubble curtain diverts and guides fish.

the late summer and fall of 1957. During September 1958 commercial fishermen and Bureau personnel operated cooperatively to demonstrate that the air-bubble curtain can be employed to direct sardines from deep water into areas accessible to seine gear. Catches of 1,000 and 3,000 bushels were made when the air curtain was set in conjunction with a seine. The curtain of air bubbles extended from the shore to the middle of the channel, and diverted fish into the seine that would otherwise have been inaccessible to any kind of net. Later the offshore end of the air curtain was towed ashore sweeping in fish remaining between it and the shoreline.

Maine sardines this year have not been readily available for capture by standard procedures. Through use of the air-bubble curtain, at an estimated total installation cost of $4,000 per vessel, one operator stated he could recover this entire cost (ex-vessel price of sardines about $1 a bushel) in one set of his seine.

Note: Also see Commercial Fisheries Review for December 1957 pp. 28-29 and January 1958 pp. 40-41.

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HERRING LARVAE SOUGHT IN GULF OF MAINE-GEORGES BANK AREA (M/V Delaware Cruise 58-5): The purpose of the cruise was to locate and measure the extent of spawning on the offshore spawning grounds of sea herring (Clupea harengus) and to sample the newly-hatched herring larvae.

On October 14, 1958, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware completed a 1,391-mile offshore plankton and oceanographic cruise in the Gulf of Maine-Georges Bank area. A total of 34 oblique one-meter plankton tows were made at designated stations, 408 drift bottles were released, 76 salinity samples were collected, and 156 bathythermograph casts were made during the nine-day cruise. Hardy plankton recorders were towed over the entire cruise line.

Oregon

THIRD EXPERIMENTAL PROJECT ESTABLISHED FOR REARING SALMON UNDER NATURAL CONDITIONS: Construction of an experimental natural "fish farm" for salmon on the east fork of the Millicoma River in Coos County was announced on October 3, 1958, jointly by the Oregon Fish Commission and one of the largest timber companies in the Pacific Northwest. It will be the third and largest such project in the State's efforts to supplement and establish fish runs in coastal streams.

The half-mile long "oxbow" in the river was created when the timber company recently changed the original channel in re-locating a private logging road.

The principle of fish farming is not new, having been practiced in Europe and the Orient for centuries. The experiment in Oregon is designed to compare relative merits of artificial feeding and raising of migratory fish in hatcheries with the as-yet-unproven natural holding pond methods.

The Commission Director explained that the 10-acre pond will hold some 500,000 salmon fingerlings with supplemental feeding under natural conditions. When they are approximately one year of age, the fish will be released from the pond into the river to pursue their ocean-bound course.

The experiments are designed to lower current costs of raising fish in hatcheries by placing fingerlings in impounded waters with a natural food supply. Three ponds leased for the consideration of one dollar from a plywood company by the Commission have been in operation for several years on the nearby south fork of the Coos River.

At a cost of more than $5,000, the timber company installed culverts and other modifications in two earth fills to accommodate the holding pond. "In addition," the Director stated, "the company has voluntarily spent approximately $8,000 to modify the new channel bed as a fisheries protection measure." The pond will be stocked with silver salmon fry by the Commission Hatchery Division.

"The timber companies have expressed a genuine interest in the improvement of our fisheries resource," the Director added. "There was no other reason for them to cooperate with the Commission in these projects." The company will lose an acre of tree-growing land on the east fork because of the rearing pond.

Oysters

STANDARDS OF IDENTITY RESEARCH PROGRAM INITIATED FOR SHUCKED OYSTERS: A Steering Committee--composed of a representative from each of the three cooperating organizations, Oyster Institute of North America, U. S. Food and Drug Administration, and U. S. Bureau of Commercial Fisheries--has made progress toward establishing the basis for a joint study for future standards of identity of shucked oysters.

A number of meetings have been held to select a site for the work and a Director for the program. Efforts were made to formulate the aims of the investigations and to outline, where possible, specific projects.

It was agreed that there will be three research workers. Each of the organizations will be responsible for the financing of one of the scientists.

The laboratory work will be centered at the Virginia Fisheries Laboratory, Gloucester Point, Va. Excellent facilities are being made available there for these studies. This is almost an ideal location for the research work. There are many oyster plants within a radius of 25 miles and there are oyster beds in the York River close by the laboratory.

Studies of washing, blowing, etc., will be made in plants in various parts of the Chesapeake Bay. Packers will be asked to make available space in their plants from time to time. Also oysters will be requested to be used in the studies.

The industry has agreed to supply plant space for tests, and oysters on which the tests can be made both in the plant and in the laboratory.

The oyster industry for the first time in modern history has an opportunity to become an equal partner to develop the basis for standards which will be sound, fair, and practical.

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SURVIVAL OF 1958 LONG ISLAND SOUND OYSTER SET QUESTIONABLE: In August of 1958 there were indications that nature had been kind to Long Island oyster growers and that a general set had been obtained. Survival of such a set would have brought about a recovery in production, which was down substantially because of many successive set failures, disastrous storms, and the recent starfish invasion.

The optimism was short-lived due to attacks by the 1957 crop of starfish. Constant mopping and suction dredging on the limited grounds still being farmed were inadequate to repel the invading starfish hordes.

It is the hope of the oyster industry that the Long Island growers may find some areas which are free of starfish to which the new set can be transplanted. This seems to be the only recourse open to the Connecticut and New York oyster growers.

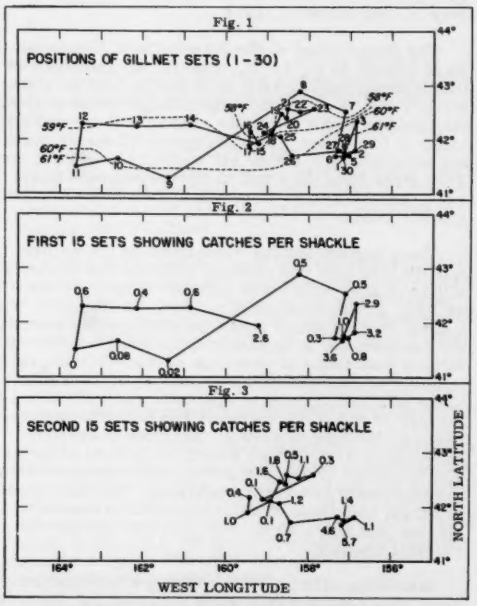
Pacific Oceanic Fishery Investigations

ALBACORE TUNA FISHING WITH GILL NETS AND TROLLING GEAR TESTED BY M/V "PARAGON": Studies to determine the feasibility of fishing albacore tuna with gill nets supplemented with trolling gear were conducted (July 26-August 30, 1958) by the U. S. Bureau of Commercial Fisheries chartered vessel Paragon.

Grounds Fished: Effort was expended primarily on two grounds. The first centered around 41°40' N., 157 11' W. and 6 sets were made in and around this position from July 26 to July 31 (fig. 1). With the failure of this area, which was on the warm (62° F.) side of a temperature front, sets 7 and 8 were made in the cold (57° F.) water to the north and northwest. Exploration was then extended westward with sets 9 through 14 and culminated in set 15 (fig. 2). Ten sets were made in this second area, which showed promise. Expectations were not realized and the remaining 5 sets were made en route to and in the first area fished (fig. 3).

Albacore Gill-Net Catches: The total catch from 30 sets of gill nets, comprised of 40 shackles, was 1,617 fish; of these 1.0 percent (17) were lost during retrieving and 5.8 percent (94) were shark-damaged. The weight of fish placed in the hold was estimated at 26,532 pounds. The average catch per shackle for all 30 sets was 0.6 with extremes of 0 to 5.7. The first area fished was the more productive yielding half the total tonnage in 5 sets.

Albacore Troll Catches: Ignoring a few fish taken en route to and from the above area (fig. 1), 212 fish were taken in conjunction with gill-net sets. This represented 1.1 fish per hour within 194½ hours trolled and 1.5 fish per 10 line hours within 1,421 line hours trolled. Individual catches ranged from 0-7.4 per hour during a given day. Total weight was estimated at 2,938 pounds.



M/V Paragon cruise (July 26-August 30, 1958).

Other Fishes Taken: Seventeen black tuna, Thunnus orientalis, were captured in the nets and all, estimated at 435 pounds, were placed in the hold. Most of these were small fish averaging about 15

pounds each, but one large fish was taken estimated at 195 pounds. Eighteen broadbill swordfish, Xiphias gladius, were captured, but two were lost in attempting to board them. An estimated ton was placed in the hold. Sharks varied in catch as much as albacore, but not necessarily within sets. A total of 2,026 shark, mostly great blue shark, Prionace glauca, was taken in the 30 sets. This represented an average of 1.7 per shackle with extremes of 0.3-5.4 per shackle.

Temperature, Secchi Disc Measurements: The average temperature fished for albacore was 60.1° F. with extremes of 57.4° F.-64.0° F. Greatest success was had generally in the upper and the poorest in the lower portion of this range. The surface temperature front shown in figure 1 was located 2° to 3° south of its normal position dur- July and August. Thirty bathythermograph loweringsings to 180 feet were made. All but one were at gill-net stations; the lowering at station 2 was omitted. Each was accompanied by Secchi disc readings. The average depth of the readings was 9 fathoms with extremes of 6½ to 11 fathoms.

Night Light and Daylight Surface Observations: A 100-watt bulb extending about 1 foot from the ship and 10 feet above the water was turned on for a period of 30 minutes to one hour during darkness following the setting of the nets. The general absence of organisms under the light was striking. Although whales, seals, birds, and scattered sunfish were not uncommon, smaller organisms such as saury, vellela, and pelagic barnacles were rarely seen.

Weather: Conditions were generally good for setting the nets and only three days were lost because of bad weather.

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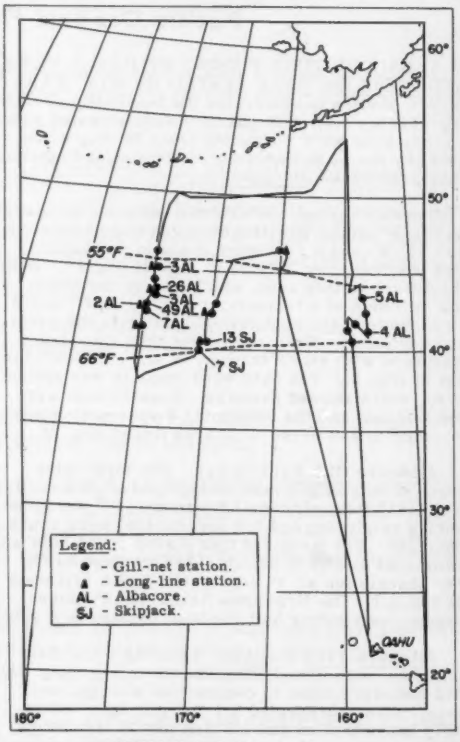
CENTRAL NORTH PACIFIC ALBACORE TUNA OCEANOGRAPHIC, AND PLANKTON SURVEYS (M/V Hugh M. Smith Cruise 46): An oceanographic and plankton survey and albacore fishing with troll ing, gill-net, and long-line gear in the central nortl Pacific area were conducted by the U. S. Bureau of Commercial Fisheries Pacific Oceanic Fishery Investigations research vessel Hugh M. Smith from July 21-September 9, 1958.

The observation at the International Geophysical Year station at 21°11' N., 158°19' W. consisted of two oceanographic casts; a 15-bottle cast to 1,400 meters was made at the time of high water at Honolulu Harbor and a 10-bottle cast to 500 meters was made at low water. Two oblique 0-60 meter plankton tows with a 1-meter net were made at 2300 and 2330 local zone time and bathythermograph casts were made at 1-hour intervals between the oceanographic casts.

The program for the remainder of the cruise was divided into two phases. Outside the primary albacore area which was defined roughly by the 66°-55° F. surface temperatures, the program was limited to data which would be sufficient to permit tne comparison of oceanographic and plankton conditions with those of previous years. Oceanographic observations consisted primarily of 13-bottle casts to 1,200 meters at approximately 90-mile intervals on the N.-S. transect and bathythermograph casts at 30-mile intervals. Samples from each bottle were analyzed on board for dissolved oxygen and inorganic phosphate and salinity samples were preserved for laboratory analysis. The biological program consisted of a 30-minute 0-140 meter oblique tow and a 30-minute surface tow and incidental trolling.

Inside the albacore tuna survey area, the program was considerably more detailed and observations were more closely spaced. The 55°-66° F. temperature band was farther south than was anticipated. Instead of the 42°-48° N. limits given in the cruise plan the area was actually between 39°30' N. and 46°30' N.

Within the area 13-bottle casts to a depth of 1,200 meters were made at intervals of not greater than 60 miles on the N.-S. transects and bathythermograph casts were made at approximately 15-mile intervals and before and after gill-net and long-line sets. Oceanographic casts were made on either side and bathythermograph casts were made at 1-mile intervals across a tempera-



M/V Hugh M. Smith cruise 46.

ture front centered at 41°30' N., 175°07' W. The temperature change in the front was from 61.5° F. to 63.5° F. in 4 miles.

Nineteen gill-net sets consisting of 10 shackles of $4\frac{1}{2}$" to $7\frac{1}{2}$" mesh net each were made at surface temperatures between 53.0° F. and 65.7° F. Albacore were taken in only 7 of the sets and the total catch was only 97 fish. The best catches were 49 at the station at 42°47' N., 175°08' W. and 26 at 43°29' N., 174°48' W. Repeat sets at these stations yielded only 7 and 3, respectively. The catches at the other three stations were 3, 4, and 5. Twenty skipjack (13 at one and 7 at the other) were taken in the two southernmost sets along 170° W. Other catches were 194 sharks, mostly great blue, a few bramids, boarfish, squid, and two fur seals in the set at 46°34' N., 164°44' W.

Seven sets of the surface long-line gear were made. All sets either preceded or followed a gill-net set. Each set consisted of 20 baskets of 12-hook gear having a buoy on each dropper so that the depth at which each hook fished depended solely on the dropper length. Each basket had 3-12 ft., 3-24 ft., 3-48 ft., and 3-96 ft. droppers. Only two albacore were taken, one on a 24-ft. and one on a 48-ft. dropper at the station at 42°48' N., 175°08' W. A total of 226 sharks (221 great blue, 4 mackerel, and 1 mako) were taken; the largest single station shark catch was 66 great blues at 42°13' N., 170°11' W. Two alepisaurus were the only other fish taken.

Trolling was also very unproductive. Except for the run back to Honolulu five lines were trolled at approximately 6.5 knots during all daylight runs in waters having surface temperatures between 52° F. and 72° F. but only 13 albacore were taken. Although the vessel circled after each strike, they were taken individually except for two catches of 2 fish each. Only three of the albacore were tagged and released. Only one albacore school was sighted during the cruise--at 45°08' N., 174°47' W. while patrolling a long-line set. Although three albacore had been taken the night before in a gill-net set in the area, none was taken on the long-line set or the trolling lines.

Twenty-nine 0-140 meter oblique and 25 surface plankton hauls were made with the 1-meter net, and seven surface hauls were made with the 45-cm. net. Five of the latter were made across the front centered at 41°30' N., 175°07' W.

Settled volume estimates of the 1-meter net hauls made in the field revealed a marked east-west change in both the content and volume of the samples from the eastern and western limits of the albacore survey areas. For example along 160° W. longitude the 140-meter hauls averaged 280 cc. (range 135-360 cc.) and were composed of a mixture of euphausids, chaetognaths, and coelenterates and had no concentration of crustacea. Along 170° W. longitude the 0-140 m. hauls averaged 600 cc. (range 300-1200 cc.) and were mostly euphausids and calanus.

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MARQUESAN SARDINE REPRODUCES IN HAWAIIAN WATERS: In 1955 the Pacific Oceanic Fishery Investigations (POFI) began introducing a sardine from oceanic waters near the Marquesas Islands into those near the Hawaiian Island of Oahu. Plants were made at the end of seven research cruises, with numbers ranging from 3,000 to 53,000. The most recent release was on June 23, 1958.

The scientists and fishermen found that these small fish of the herring family are abundant in the Marquesas and are very good bait for tunas. The releases into waters around Oahu were made in the hope that these sardines would spawn and thus augment the presently insufficient supply of bait for the local skipjack fishery.

Through the cooperation of commercial fishermen, there have been several recoveries of these introduced fish. Until the fall of 1958, these recoveries were all from waters near Oahu, the general area of the plantings. Recently, fishermen seining for bait near the islands of Kauai and Maui caught numbers of the Marquesan sardines. Although some of these recoveries could have been from recent releases, the small size of most of them is definite evidence that these Marquesan sardines have found Hawaiian waters to their liking and have successfully spawned.

Whether the sardine will become abundant enough to be economically significant should be answered in the next two or three years. If it does become abundant, the tuna bait supply in the islands might be doubled or tripled, for the sardine seems to prefer sandy, rocky beaches rather than the slightly brackish bays generally utilized by the local nehu.

Even more significant is the hardiness of the sardine as contrasted with the delicate nehu. Properly handled, the sardine can withstand long ocean voyages and would permit Hawaiian fishermen to venture farther afield.

Additional benefits might accrue to reef fishermen for the sardine will augment the food supply of such fish as "ulua," opening the way to larger populations. In effect the sardine will convert zooplankton drifting by the islands into usable form for game fishes.

Aside from the commercial implications, the introduction represents an interesting zoogeographical experiment. The fish fauna of the Hawaiian Islands is poor in species compared to island groups to the southwest. Some authorities argue that the great distance to Hawaii is the controlling element. Others argue that suitable habitats for many species are absent here. Introduction circumvents the distance factor, and the early success of the transplanted sardine indicates that distance was the reason for its absence here.

Of additional interest is the fact that the introduction of the sardine to Hawaii is the first known instance of successful transplanting of a purely marine species of fish.

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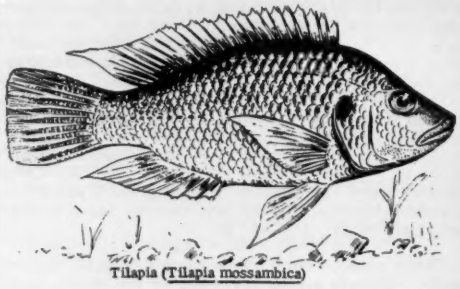
SECOND TILAPIA BAIT-REARING PROJECT INITIATED: As a result of the success obtained by U. S. Bureau of Commercial Fisheries biologists with the commercial pilot-plant tilapia tuna-bait rearing project at Paia on the Island of Maui, an experimental tilapia rearing plant was established at POFI's Kewalo docksite headquarters in August 1958 to investigate the effects of various diets on the rate of production of young and the effects of various sex ratios also on the rate of production of young. This plant produced about 54,000 young fish in September, and the results already obtained relate in an interesting way to the various factors being tested. Sex ratios of 1:2 and 1:3 (males to females) have been highly productive, whereas ratios of 1:4 and 1:6 were not. In addition, concentrations of 30 and 50 adult fish per tank of about 50 square feet bottom area produced many more young than 70 or 90 fish per tank. Of the three feeds being tested, one appeared much better in terms of young fish being produced than the other two.

While conclusions based only on a single month's operation can hardly be considered final, nevertheless these results indicate that the experimental design is sound and that the variables being investigated are of real significance in the design of any commercial tilapia bait-rearing project. It is of interest that the particular sex ratios chosen for the Paia plant, a ratio of 3 females per male, seems



Tilapia (Tilapia mossambica)

to be one of the better ratios as indicated by the Kewalo experiments. Additionally, the food chosen for the fish at the Paia plant seems to be one of the better foods insofar as giving a high production of young fish.

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SKIPJACK TUNA BEHAVIOR STUDIES PROVIDE A POSSIBLE KEY TO NEW FISHING METHODS (M/V Charles H. Gilbert Cruise 41): The U. S. Bureau of Commercial Fisheries' research vessel Charles H. Gilbert returned to Honolulu on September 27 after completing a 52-day cruise in Hawaiian waters, according to the Director of the Pacific Oceanic Fishery Investigations. The cruise

The Service's research vessel Charles H. Gilbert.

was designed to study the behavior of skipjack, also known as aku in Hawaii, in their natural environment, and measure certain variables in the environment itself. The cruise was part of a continuing program to determine the relationship between changes in the environment and changes in the abundance of skipjack in Hawaiian waters. As on earlier cruises, part of the observations were concentrated in a small area off leeward Lanai, where at certain times the tuna tend to congregate. Skipjack were very scarce in this area during the cruise as compared to earlier cruises, and this provided contrasting conditions of fish abundance useful in comparing changes which may be noted in the sea itself.

A portion of the cruise dealt with a study of the reaction of skipjack to different conditions and substances. The biologists were making these observations from a caisson suspended from the side of the vessel. This caisson, a metal cylinder fitted near the lower end with glass ports, permits an observer to record the activities of the skipjack and bait on film, and to do so while remaining relatively comfortable and dry. During these behavior studies, the reaction of skipjack to blood, red dye, and certain skipjack skin extracts was recorded. In addition, the response of skipjack to a promising new bait fish, the threadfin shad, was tested. It appeared that the shad are indeed acceptable to the skipjack, as they were eaten up almost as soon as they hit the water. The importance of developing a reliable auxiliary bait supply is well known to all segments of the fishing industry and the threadfin shad is one of two fish being tested at present, the other being the tilapia.

Once during August and once during September the Charles H. Gilbert participated in the International Geophysical Year program by conducting hydrographic stations off Barbers Point, Oahu.

Pacific Salmon Investigations

TESTS ON "ENDLESS" FISHWAY TO CUT IN CONSTRUCTION COSTS: An endless fishway has been installed at the Fisheries Engineering Research Laboratory at Bonneville Dam and is being used in experiments in Seattle.

The endless ladder, first of its kind ever built, seeks to answer the questions: To what height will a salmon ascend a fishway? How fatigued does a fish become in climbing a large number of pools? What is the comparison in swimming performance in various steepness of fish ladders?

There are two endless fishways, one of standard slope (a rise of one foot every 16 feet) and the other steeper (a rise of one foot in eight feet). The fishway structures are rectangular units with a lock that connects the highest pool to the lowest pool. The fish enters the lock and the water is exhausted to the lowest level in the fishway from which the salmon starts his passage. The cycle will be repeated as many times as the fish continues to climb the watery treadmill.

Upon completion of the fishway runs, biochemists will make studies to determine the state of fatigue in the salmon.

No one knows how high a fish will ascend a fishway as there are no dams in the Columbia River at present that require salmon to ascend more than 100 feet. In the experimental fishway there is no limit to how high a fish can go other than physical abilities and inclination of the fish. It is hoped the fish will "climb" at least 100 pools without showing signs of undue fatigue.

Tests to date at the Bonneville Laboratory show promise of reducing costs of future fishway construction. These narrower and steeper fishways would, of course, be a tremendous saving in costs of future fish passage facilities at proposed dam-sites.

In the short period of operation, many interesting facts and sidelights on the anadromous runs of fishes in the Columbia River have been observed by the scientists. For example, the steelhead trout chose a darkened passageway to a light one in the preference tests; they could even swim very rapidly in the dark without visual reference; and they could swim in very fast water (up to 16 feet per second) that stopped salmon movement. The biologists had to build an extension wooden fence on top of an eight-foot high cement wall to keep the steelhead from jumping over at the entrance to the laboratory and one fish demonstrated his jumping skill by leaping some eight feet from the holding pool and breaking a large 1,000-watt mercury-vapour lamp overhead.

The king salmon registered some likes and dislikes with the biologists too. Some climbed six pools in the experimental ladder in 46 seconds while some loitered in a single pool for nearly three hours. They preferred the walls to the center of the pool when passing a weir, and they showed their sense of smell is keen. If a worker accidentally placed his hand or foot into the water the fish would take to the bottom and not move for a half hour or so. (Outdoor California, September 1958, of the California Department of Fish and Game.)

Safety Aboard Fishing Vessels

NEW WINCH-HEAD CONTRIBUTES TO TRAWLER SAFETY: Operational methods used to handle the heavy fishing gear employed in otter trawling have remained practically unchanged since the introduction of this fishery in Boston in 1905. Improvements in trawler construction and design, more efficient propulsion machinery, and navigational aids and fishing equipment have progressed steadily, while trawl-net setting and hauling operations on board the offshore trawling fleet differ but slightly today from those performed by the fishing crews over the past 30 years.

In an effort to eliminate manual handling of wire cables in two of the most hazardous operations connected with this fishery, the U. S. Bureau of Commercial Fisheries recently installed a new type winch-head on board the Bureau's exploratory fishing and gear research vessel Delaware.

Records indicate that many serious accidents occur at the winch-heads when fishermen are using the messenger wire or fish tackle to "hook-up" the towing cables or hoist inboard the fish catch in the cod end of the trawl net. Both operations entail wrapping the wires around a revolving winch-head with the friction of the wire on the drum producing the power point for the lifting operation. Depending on the weight and strain involved, from 4 to 7 complete turns of the wire are needed to hook up the towing wires or to hoist the fish bag inboard.

Even under ideal weather conditions, performance of these tasks are considered dangerous, with greatly increased hazards when carried out during rough weather conditions prevailing on the offshore banks at least 25 percent of the season. Substitution of mechanical for manual handling of these duties should eliminate two especially hazardous tasks.

Fabrication of a new type winch-head was completed recently and installed on board the Delaware. The inner drum of the winch is flange-protected to guard against excessive wire build up, with a holding stud fitted into the center of the drum for attaching the eye splice in the end of the wire.

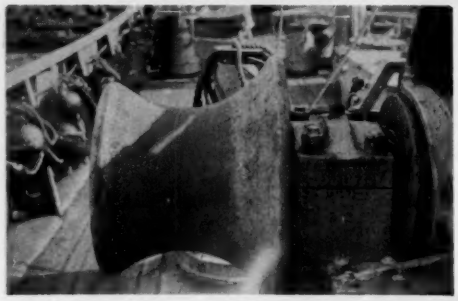

Fig. 1 - Conventional-type winch-head used aboard the exploratory fishing vessel Delaware prior to installation of the new one.

Testing of the device was carried out during a recent trip of the Delaware. Both operations were handled speedily and smoothly on the new drum without manual guidance of the wires.

Application of this device is limited at present to boats equipped with trawling winches capable of reversing action. Because of the difficulty in removing the wire from the drum, the winch must be reversed unless sufficient slack is present to allow the wire to be slipped off the drum. Modifications are indicated before the device can be adapted for use on boats with nonreversible winches.

Fig. 2 - New double-barrelled winch-head with holding stud recently installed on the M/V Delaware.

Fig. 3 - Hook-up operation completed--messenger wire on new winch-head on the M/V Delaware.

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UNSAFE CONDITIONS ABOARD NEW ENGLAND TRAWLERS LISTED: The Bureau of Commercial Fisheries New England safety program staff has prepared a list of unsafe conditions found on New England large and medium otter trawlers. The list is "far from complete," but elimination of these hazards and conditions could contribute greatly towards reducing the present accident rate, and save both lives and money.

1. No Guard Rails on Deck Bollards: Guard rails should be mandatory equipment on all large and certain medium-size trawlers.

2. Trawl-Wire Spooling Mechanism: Installed on a very few of the large trawlers--should be mandatory on all large and certain medium-size trawlers. Situation not too critical in small otter-trawl fleet.

Fig. 1 - Various nonskid materials which could be used to improve deck-footing conditions on fishing vessels. These were exhibited this past summer at the dock of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware prior to sailing on a safety cruise.

3. Towing-Block Snubbing Chain: Install chain on all blocks to prevent block from flying inboard when trawling wires are released. Recommend this be made mandatory for all large trawlers.

4. Installation of Pilothouse Winch Control Switch (Electric-Driven Winches Only): Should be installed within easy reach of man in pilothouse for use in emergencies only. Would provide a double check on winch operator and introduce extra safety factor to a potentially-dangerous operation.

5. Inadequate Guards on Chain-Driven Power Takeoffs: Many medium trawlers operate trawl winches by means of a direct-chain drive from main engine. Invariably, the chain drives are poorly guarded and jammed up in an almost inaccessible location. Recommend a complete guard enclosing all chain drives.

6. Smooth Deck Surfacing: Injuries resulting from falls on shipboard comprise a large part of all fishing fleet insurance claims. While deck footing conditions during actual fishing operations are admittedly hazardous, addition of abrasive material to main deck working areas would assure safer footing. Application of skid-resistant materials presents an inexpensive means of combating shipboard injuries from falls, and should be required on all fishing vessels.

7. Insufficient Clearance on Mast Ladders: Inspection of mast ladders show that many are set too close to the mast with insufficient toe room for climber. Ladders should be positioned for ample foot clearance for climber and space to allow leg entry between ladder and mast.

8. Unlighted Boat Launching Areas: Lifeboat launching areas should be adequately lighted--preferably with a battery-operated light independent of vessel's main power supply.

9. Fuel Supply Shut-off Valve: A fuel supply shut-off valve should be located outside of main engineroom for emergency stops in the event that access to the engineroom is blocked.

10. Carbon Tetrachloride and CCl_4 Formula Fire Extinguishers: Should not be carried on shipboard where fires are invariably fought in enclosed spaces. Replace with dry powder or CO_2-type extinguishers.

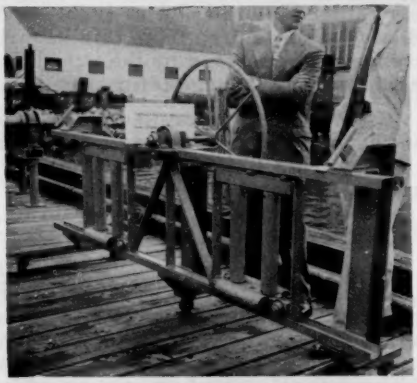


Fig. 2 - Trawl-wire spooler on display at a safety exhibit.

11. Rigging of Lifelines During Heavy Weather: When vessels are jogging or running in heavy weather, lifelines should be rigged from forecastle to breakdeck and further aft to galley entrance if indicated.

12. Pyrofax Gas Burners in Galley and Engine Room: Gas heavier than air and highly explosive--extremely dangerous when leaks occur and gas settles in bilges.

13. Worn or Slippery Companionway Steps: Frequently found on medium and small boats and unnoticed until an accident happens. Addition of treads to steps would afford maximum protection.

14. Unvented Fuel Filling Pipes: Vent pipes should be required for all fuel-filling lines to prevent overflow of fuel into bilges.

15. Inspection Standards for all Commercial Fishing Vessels: Fishing vessels should be subject to official inspection and maintenance standards, with certification by marine surveyors. With the cooperation of the fishing industry and insurance companies, standards can be developed for various classes of boats, based on tonnage, type of fishing, or combinations of both factors. Major subjects would include--hull construction, engine installation, deck and fishing equipment condition and layout, fire-fighting equipment, safety appliances, life-saving equipment, and periodic inspections.

* * * * *

UNSAFE PRACTICES ABOARD NEW ENGLAND TRAWLERS LISTED: The U. S. Bureau of Commercial Fisheries New England Safety Program staff has prepared a list of unsafe practices found on New England large and medium otter trawlers. The list is "far from complete," but elimination of these hazards and practices could contribute greatly towards reducing the present accident rate, and save both lives and money.

1. Crossing Over Trawl Wires While Wires are in Motion: It is common practice for the men to step over the trawl wire during setting and hauling of the trawl net. This is an extremely dangerous act particularly during net setting when the wires are speeding through the deck bollards, and a slip would throw the man onto the wire and through the bollard. This act should be outlawed on all large and medium vessels. Guard rails for deck bollards, similar to the type now found on the Bureau's M/V Delaware, and the trawlers Luckimee and Cashmeer, should be made mandatory equipment on all large and medium trawlers.

2. Hand-Steering of Trawl Wires on Winch Drums: An extremely dangerous situation in which men stand directly in front of trawling winch and by means of heavy steel bars attempt to evenly spool incoming wire onto winch drum. Many accidents have resulted from this hazardous arrangement. Installation of a steering arrangement operated by the winch operators from back of the winch should be made mandatory on all large otter trawlers.

3. Winch Operator Leaving Station During Hauling Operation: A common practice, especially on the medium trawlers, is for the winch operator to leave his post at the controls while the trawl wire is being retrieved. While the operator may not stray more than a few feet away from his post, this could result, and has in the past resulted, in serious accidents both to personnel and equipment, due to operator's delay in reaching the winch-stop control.

4. Using Improper Tools to Release Towing Wires from Hook-Up Block: During fishing operations the trawling wires are locked into a towing or hook-up block attached to the stern quarter of the vessel and held in the block by a hinged steel section secured by a heavy locking pin. Release of towing wires prior to hauling the net is done by removing locking pin and prying or knocking hinged section upwards. In many cases a short wrench or spanner is used and the violent spring of the released block strikes the tool or hand of the operator. A long heavy bar is indicated for this operation and should be provided and used for this act.

5. Use of Improvised Platform to Reach Trawl Doors in Gallows: Use of wooden rollers, boxes, or similar items, placed under the forward gallows to allow men to reach fishing gear is a common practice on large vessels. This presents an insecure footing and can be eliminated by installing a steel platform at the base of the gallows, of sufficient height as needed.

6. Leaving Deck Bunker Plates Open and Unattended: Many vessels have deck bunker plates for loading fish below deck and also used to unload fish at dockside. Occasionally, the openings are left unguarded and present a definite hazard to the unwary--this is especially dangerous when allowed during unloading operations when other than regular crew members are working on board.

Sea Trout

TAGGING TO STUDY MIGRATIONS AND GROWTH RATE: In order to study the migrations and growth rate of spotted sea trout (Cynoscion nebulosus), biologists of the Marine Laboratory of the University of Miami at Coral Gables, Fla., have tagged 414 fish, 201 of which were tagged in the Fort Myers area and the rest around Cedar Keys.

The tags being used in this program are not visible from the outside as they are placed inside the body cavity of the fish. This causes no permanent injury as the tag is inserted through a very small incision cut in the fish. The tags have been used successfully on Pacific sardines, Atlantic gray sea trout, and other species.

The tags (green in color) made of plastic, 1.25 inches in length and 0.25 inch wide, can be seen as soon as the fish is caught and eviserated. Instructions are printed on the tags for their return to the nearest commercial fish dealer, where the finder will receive a reward of 75 cents for each tag.

Spotted sea trout were tagged from Fort Myers to Pensacola. However, it is quite possible that these tagged fish may be caught far afield and fish-

ermen are requested to examine all spotted sea trout caught.

This tagging program is part of the work being done by the Laboratory for the Florida State Board of Conservation.

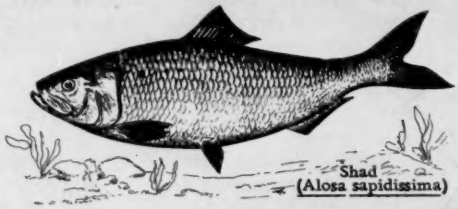
Shad

BIOLOGISTS DISCOVER SHAD PASS SAFELY THROUGH TURBINES OF CONOWINGO DAM: The preliminary phase of the 3-year Susquehanna fishery study is well under way, according to the Chairman of the Advisory Committee and Director of the Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md. The project is designed to provide a sound biological basis for deciding whether or not passage should be provided for migratory fish at Conowingo Dam which is located near the confluence of the Susquehanna River and Chesapeake Bay in Maryland.

Shad planted in Conowingo Reservoir were able to pass successfully out of the impoundment and through the turbines of the dam, according to the five-man Advisory Committee which recently reviewed the work of biologists on the Susquehanna fishery study project during 1958.

A total of 2,983 shad were tagged, of which 2,086 were planted above the Conowingo Dam last spring to determine whether they would survive, spawn, and successfully negotiate the dam on their downstream migration. Tags received by biologists from fishermen who caught the fish below the dam amounted to 6 percent of the shad planted above the dam. The 83 fish that passed through the turbines confirmed earlier evidence that fish would live. The spillway gates were not open between the dates of tagging and recapture.

Two of the tagged shad were reported caught at Cape Charles, Va., one 8 days and the other 28 days after being released. Another tagged shad was taken in the Potomac River 14 days after tagging. Recaptures of most of the tagged fish, however, were concentrated in the area of Chesapeake Bay between Baltimore and the Susquehanna River. An angler caught one of the shad above the dam.



Shad
(Alosa sapidissima)

Balloons and shad seem unrelated, and yet some interesting information was obtained by attaching them to the fish with long nylon lines in an attempt to follow their movements after release. The shadow of the railroad bridge across the mouth of Conowingo Creek apparently appeared to act as somewhat of a barrier to the shad tagged with balloons.

Standards

MEETINGS HELD ON PROPOSED HADDOCK AND HALIBUT STANDARDS: Halibut steaks and frozen haddock fillets are due to be added to those fishery products for which quality standards are promulgated, according to the present plans of the U. S. Bureau of Commercial Fisheries.

Laboratory research by the Bureau on the proposed standards has proceeded to a point that permitted preliminary discussions with interested segments of the fishing industry, distributors, and consumers. These discussions were held in four key cities.

Following the preliminary discussions, the next stop is the formal Notice of Proposed Rule Making. Such notice provides for a 30-day period to permit further consideration by the industry and others, after which the formal standards and the effective dates will be announced.

The meetings were held on the dates indicated in the following cities: Boston, frozen haddock fillets, October 7, 1958; New York City, frozen haddock fillets and halibut steaks, October 8; Chicago, frozen haddock fillets and halibut steaks, October 10; Seattle, frozen halibut steaks, October 15.

Promulgation of quality standards and maintenance of an inspection service are responsibilities transferred from the Department of Agriculture to the Department of the Interior on July 1, 1958. Previously standards had been developed by the Department of the Interior but promulgation of the standards and the inspection of fishery products had been the legal responsibility of the Department of Agriculture.

Standards which are already in effect apply to frozen fried fish sticks, frozen raw breaded shrimp, and frozen fish blocks, which are the raw material from which fish sticks are made. Fish sticks and shrimp which have been processed in accordance with these standards may be identified by the consumer as "Grade A" or "Grade B," both of which meet rigid standards of wholesomeness and workmanship and have been processed under sanitary conditions.

There are many fishery products for which standards have not yet been established. These can not be given a "grade" designation but if they have been processed under continuous inspection they are so marked.

Since this inspection service is something for which the processor must pay, he has the choice of marketing his product with or without the inspection symbol. "Lot inspection" is available should a processor desire only occasional inspection of his product. In such a case the package may bear the following statement: "This package is one of a lot from which samples have been inspected by the United States Department of the Interior."

Up to the present time, the Bureau reports, 16 large processing plants are operating under continuous inspection, requiring the services of 22 trained inspectors.

Transportation

PAPER STRIPS REVEAL TEMPERATURE CHANGES IN PERISHABLE PRODUCTS WHILE IN TRANSIT: Simple and inexpensive, heat-sensitive recorders show whether perishable products are subject to excessive temperature and how much. A Milwaukee yeast company is monitoring shipments with "paper thermometers" that travel with the products to give warning of harmful temperature fluctuations. But so far whether this will work with frozen products is not known.

Dispatchers and carriers of perishable products know that high shipping temperatures speed deterioration. And they generally take steps to minimize such hazards, even calling for special routing. But does your own control of product quality extend beyond the shipping dock?

Specifically, if your heat-sensitive goods were to be received in substandard condition, could you quickly tell whether they were inferior before shipment or were damaged by high temperature in transit?

The company using the "paper thermometers" ships heat-sensitive materials from one plant to another, from plant to customer, and from distribution points and sales areas to laboratories for examination and study. Before instituting the monitoring system, certain atypical variations were noted in goods arriving by rail, truck, and air carrier. Although improper conditions in transit were suspected, adequate evidence and proof were lacking.

As a result, an inexpensive thermal monitor called the "Thermonitor" was designed. It consists of three different strips of specially-treated paper. The strips are glued to the back of a mimeographed, self-addressed postcard, which gives brief instructions for marking and mailing.

An additional alerting tab, in the form of a sleeve, bears the note: "Fill in This Card and Mail." This further serves to protect the paper thermometer against undue friction.

The company places a card in a single package or in several units of a large shipment. When goods reach their destination, consignee notes the strips' colors in the spaces provided on card, then returns it to sender or central laboratory for recording and filing.

During the past three years, this technique has revealed temperatures above 120° F. in several truck, parcel post, and express deliveries.

As would be expected, high temperatures in trucks usually occur during summer months. However, overheating in parcel post and express shipments can happen during any season.

Here is how the paper strips indicate excessive shipping temperature:

Normally, they are pearl-gray in color, but turn black when exposed at or beyond their designated temperatures. They also tend to blacken under compression caused by friction and stamping, but this shading can readily be distinguished from the "melted" appearance of an overheated strip. (Food Engineering, August 1958.)

U. S. Fish Stick Production

JULY-SEPTEMBER 1958: The United States production of fish sticks during the third quarter of 1958 amounted to 13.7 million pounds, an increase of 588,000 pounds (or 4 percent) as compared with the third quarter of 1957. The peak month of the 1958 third quarter was September when 5.1 million pounds were reported, and July and August followed with 4.3 million pounds each.

Table 1 - U. S. Production of Fish Sticks, July-September 1958[1/]

Months	Cooked	Uncooked	Total
	(1,000 Lbs.)		
July	3,964	370	4,334
August	3,832	437	4,269
September	4,570	566	5,136
Total 3rd quarter 1958	12,366	1,373	13,739
Total 3rd quarter 1957	11,752	1,399	13,151
Total first 9 months 1958	40,295	4,169	44,464
Total first 9 months 1957	35,036	3,819	38,855

1/ Preliminary.

Table 2 - U. S. Production of Fish Sticks, by Areas, July-September 1958 and 1957

Area	1958[1/]		1957[2/]	
	Number of Firms	1,000 Lbs.	Number of Firms	1,000 Lbs.
Atlantic Coast States	21	10,753	23	10,868
Inland & Gulf States	4	1,759	4	1,207
Pacific Coast States	11	1,227	11	1,076
Total	36	13,739	38	13,151

1/ Preliminary. 2/ Revised.

Cooked fish sticks (12.4 million pounds) accounted for 90 percent of the total production, while uncooked fish sticks (1.4 million pounds) made up the remaining 10 percent.

The Atlantic Coast States led all other areas with 10.8 million pounds (or 78 percent) of the total production. The inland and Gulf States were second with 1.8 million pounds (or 13 percent), followed by the Pacific Coast States with the remaining 1.2 million pounds (or 9 percent).

During the first nine months of 1958, a total of 44.5 million pounds of fish sticks was produced--an increase of 5.6 million pounds over the same period of 1957. Cooked fish sticks were up 15 percent as compared with the quantity reported for the same period of 1957, and uncooked fish sticks were 9 percent above last year.

United States Fishery Landings, January-September 1958

Landings of fish and shellfish in the United States and Alaska the first nine months of 1958 were only one percent below those for the same period of 1957. By the end of August 1958, landings were seven percent below those for last year, but in September large catches of sardines in California and menhaden in Delaware and Virginia closed most of the gap.

Sardine landings in California were 120 million pounds greater through October 23 this year than for the same period of 1957. Salmon landings in Alaska in the 1958 season were up 45 million pounds. Tuna landings in California for the first three quarters of 1958 were nearly 21 million pounds higher than for the same period of the preceding year. Ocean perch landings in New England were up 18 million pounds.

Menhaden landings, which were 128 million pounds behind at the end of August, improved in September. This year's landings at the end of that month were only 61 million pounds below the first nine months of 1957. Jack mackerel landings continued light and totaled less than three million pounds for the first nine months this year. During the same 1957 period, landings amounted to over 65 million pounds. Herring landings in Maine (106 million pounds) were practically the same as last year. Herring production in Alaska, however, was short by 35 million pounds. Landings of anchovies in California and whiting in New England were both down around 29 million pounds.

Table 1- United States Fishery Landings of Certain Species for Periods Indicated, 1958 and 1957 1/

Species	Period	1958	1957	Total 1957
		(1,000 Lbs.)		
Anchovies, Calif.	9 mos.	6,322	36,798	38,408
Cod:				
Maine	8 mos.	2,355	1,913	2,032
Boston	9 "	13,112	14,931	17,487
Gloucester	9 "	2,315	1,473	2,020
Total Cod		17,782	18,317	21,539
Haddock:				
Maine	8 mos.	2,973	3,439	4,097
Boston	9 "	70,477	78,145	93,617
Gloucester	9 "	8,342	7,578	8,898
Total haddock		81,792	89,162	106,612
Halibut 2/:				
Wash. &Oreg.	9 mos.	15,411	15,012	15,430
Alaska	9 "	19,888	20,679	20,733
Total halibut		35,299	35,691	36,163
Herring:				
Maine	8 mos.	106,474	106,945	153,621
Alaska	Year	82,800	118,290	118,290
Industrial fish, Maine&Mass. 3/	9 mos.	105,004	100,128	112,446
Mackerel:				
Jack	9 mos.	2,554	65,223	86,300
Pacific	9 "	13,504	26,166	55,200
Menhaden	9 mos.	1,321,451	1,332,027	1,681,600
Ocean perch:				
Maine	9 mos.	58,946	50,473	64,723
Boston	9 "	1,823	2,920	3,819
Gloucester	9 "	62,382	52,066	65,389
Total ocean perch		123,151	105,459	133,931
Salmon:				
Washington	9 mos.	46,276	39,871	43,273
Oregon	8 "	6,701	9,353	11,370
Alaska	Year	248,000	203,437	203,437
Sardines, Pacific	to Oct. 23	141,570	21,925	45,800
Scallops, sea, New Bedford	9 mos.	11,848	12,939	16,461
Shrimp (heads-on), South Atlantic and Gulf States	6 mos.	60,252	70,377	168,737
Squid, California	9 mos.	4,862	10,670	12,449
Tuna, California	9 mos.	261,648	240,914	291,234
Whiting:				
Maine	8 mos.	22,554	15,597	15,810
Boston	9 "	332	956	1,002
Gloucester	9 "	36,000	71,005	76,521
Total whiting		58,886	87,558	93,333
Total all above items		2,736,176	2,781,249	3,428,204
Others (not listed)		498,451	486,615	1,321,796
Grand Total		3,234,627	3,267,864	4,750,000

1/Preliminary. 2/Dressed weight. 3/Excluding menhaden.

Table 2 - United States Fishery Landings by States for Periods Indicated, 1958 and 1957 1/

Area	Period	1958	1957	Total 1957
		(1,000 Lbs.)		
Maine	8 mos.	214,057	202,722	290,528
Massachusetts:				
Boston	9 mos.	100,478	108,241	135,072
Gloucester	9 "	182,681	207,599	248,928
New Bedford	9 "	87,754	79,969	104,334
Provincetown	9 "	17,952	19,017	25,109
Total Mass.		388,865	414,826	513,443
Rhode Island 2/	6 mos.	53,413	63,358	121,273
New York 2/	8 "	27,898	28,969	40,223
New Jersey 2/	8 "	31,281	36,558	50,541
North Carolina	9 "	45,450	43,824	64,634
South Carolina	8 "	9,408	7,835	24,316
Georgia	8 "	11,217	10,734	18,584
Florida	8 "	91,924	86,553	140,698
Alabama	7 "	5,362	6,670	11,882
Mississippi	7 "	8,298	13,200	19,991
Louisiana 2/	4 "	15,840	15,977	63,322
Texas 2/	8 "	35,463	44,453	77,156
Ohio	9 "	15,042	22,815	22,844
Oregon	8 "	44,112	44,093	67,694
Washington:				
Salmon	9 mos.	46,276	39,871	43,273
Other	6 "	56,023	45,189	99,478
California:				
Certain species 3/	9 mos.	430,460	401,695	529,391
Other	5 "	35,932	35,752	86,862
Total Calif.		466,392	437,447	616,253
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	9 mos.	1,317,618	1,360,364	1,661,480
Alaska:				
Halibut 4/	9 mos.	19,888	20,679	20,733
Herring	Year	82,800	118,290	118,290
Salmon	Year	248,000	203,437	203,437
Total all above items		3,234,627	3,267,864	4,280,073
Others not listed		5/	5/	469,927
Grand Total		5/	5/	4,750,000

1/Preliminary.
2/Excludes menhaden landings.
3/Includes catch of: anchovies, jack and Pacific mackerel, Pacific sardines, squid, and tuna. Data on sardines are through October 23.
4/Dressed weight.
5/Data not available.
Note: Data principally represent weight of fish and shellfish.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1958: Imports of edible fresh, frozen, and processed fish and shellfish into the United States during July 1958 were up 21.2 percent in quantity and 11.0 percent in value as compared with the preceding month. Increases in July over June this year were due primarily to a sharp increase in the imports of groundfish fillets and blocks (28.9 million as compared with 19.8 million pounds); and canned tuna in brine and frozen albacore tuna from Japan.

Table 1 - United States Foreign Trade in Edible Fishery Products, July 1958 with Comparisons

Item	Quantity			Value		
	July		Year	July		Year
	1958	1957	1957	1958	1957	1957
	Millions of Lbs.			Millions of $		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed	100.9	89.1	837.0	28.3	25.7	248.4
Exports:						
Fish & shellfish:						
Processed only 1/ (excluding fresh frozen)	1.9	3.9	69.7	1.0	1.0	16.8

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

As compared with July 1957, imports this July were higher by 13.3 percent in quantity and 10.1 percent in value. Imports were higher for fresh and frozen tuna (up about 2.6 million pounds), canned tuna in brine (up about 2.1 million pounds), frozen salmon (up about 1.0 million pounds), and groundfish fillets and blocks (up 6.4 million pounds). Imports of lobster and spiny lobster were lower by 2.7 million pounds this July as compared with July a year earlier.

United States exports of processed fish and shellfish in July 1958 were lower by less than one percent in quantity but higher by 66.7 percent in value as compared with June 1958. Compared with the same month in 1957, exports in July 1958 were down by 50.6 percent in quantity and unchanged in value. Exports this July as compared with the same month in 1957 were made up primarily of higher-priced products such as canned salmon.

Exports of canned California sardines, anchovies, and mackerel were down substantially because of the very light packs of those products the last half of 1957 and the first half of 1958.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1958 at the 12½-percent rate of duty has been established as 44,693,874 pounds. Any imports in excess of this established quota will be dutiable at 25 percent ad valorem.

Imports from January 1-October 4, 1958, amounted to 38,069,410 pounds, according to data compiled by the Bureau of Customs. This leaves a balance of 6,624,464 pounds of the quota which may be imported during the balance of 1958 at the 12½-percent rate of duty. Last year from January 1-September 28 a total of 30,034,996 pounds had been imported.

* * * * *

FISHERY PRODUCTS EXPORTS LOWER IN 1957: Foreign markets bought less fishery products from the United States in 1957 than in 1956. Principal declines occurred in trade with the Philippines, West Germany, and the Netherlands. The decline was mainly due to reduced exports of canned sardines and fish oil.

United States fishery industries depend on foreign market outlets for many of their products. During 1957, about 289 million pounds of United States fishery products were exported to foreign markets. These products were valued at $36 million. During 1956, 325 million pounds, valued at almost $40 million, were sold abroad.

Canada, the Philippines, and West Germany were the three leading markets in 1957, taking fishery products valued at $8.3, $6.0, and $5.0 million, respectively. Canada's trade increased slightly over that of 1956; that with the Philippines declined by $2 million; and West Germany trade dropped by about $1 million. The Netherlands, among the leaders in previous years, in 1957 dropped behind the United Kingdom which was in fourth place in dollar value of trade.

Canned salmon was the most widely-distributed fishery product in our 1957 export trade; this product was sent to 73 countries, and exports were up about 25 percent from 1956. Canned shrimp was exported to 47 countries; canned sardines

to 41; canned tuna to 26; frozen salmon to 21; and fish oil to 23 countries.

Trends by Country: In 1957, Canada spent more dollars for United States fishery products than any other country. The value of United States shipments to Canada totaled $8.3 million. Frozen and canned shrimp, valued at nearly $3.0

Table 1- Value of United States Exports of Fishery Products, by Principal Country of Destination, 1956-57

Country	1957	1956
	($1,000)	
All countries	35,952	39,503
Canada	8,288	7,990
Philippines	6,024	8,058
West Germany	5,098	6,118
United Kingdom	3,708	2,204
Netherlands	2,969	4,956
Sweden	1,682	843
Norway	970	1,065
Cuba	720	727
Japan	669	537
Venezuela	572	492
Belgium	447	574
Italy	259	295
France	258	431
Ecuador	256	288
N. Antilles	239	139
Panama	227	157
Greece	202	257
All others	3,364	4,372

million, were the principal commodities in this trade. Next in value were fur-seal skins (dressed or dyed) valued at $1.9 million.

The Philippines in 1957 imported products valued at $6.0 million, consisting principally of canned anchovies, mackerel, sardines, salmon, and squid. Shipments to the Philippines in 1957 declined by $2.0 million from 1956, mainly owing to reduced shipments of canned sardines. Canned mackerel exports, however, increased by $1.7 million in value from 1956.

West Germany, the principal market for the United States fish oils, imported fishery products in 1957 valued at $5.1 million, and indirectly, was believed to be the ultimate destination for a large part of the fish oils sent to the Netherlands valued at $2.5 million.

The United Kingdom in 1957 bought fishery products valued at $3.7 million, of which canned salmon made up $3.4 million.

Exports to Latin American countries in 1957 totaled $3.2 million. Cuba and Venezuela were the two largest outlets in this area. Exports to Latin America have declined in recent years as a result of reduced shipments of California sardines. The decline was due in part to lower domestic packs of sardines.

Commodity Trends: Fish and fish-liver oils valued at $10.7 million were the largest item in the 1957 export trade. This was a substantial decline from the $12.9 million exported in 1956 (see table 2).

Table 2 - Value of United States Exports of Selected Fishery Products, 1956-57

Commodity	1957	1956
	($1,000)	
Fresh or frozen:		
Salmon	446	694
Oysters, shucked	589	521
Shrimp	1,471	1,202
Mild-cured salmon	226	399
Canned:		
Salmon	4,740	3,606
Sardines, in oil	125	84
Sardines, not in oil	2,654	6,417
Tuna	202	136
Mackerel	2,146	335
Other fish (mainly anchovies)	2,137	2,836
Shrimp	2,410	2,650
Other shellfish (mainly squid)	1,632	1,932
Fish and fish liver-oils	10,725	12,869
Oysters and other shells for feed	571	523
Shells, unmanufactured	775	821
Pearl essence	252	355

Canned salmon exports in 1957 totaled $4.7 million, an increase of $1.1 million from 1956. Most of this gain represented increased shipments to the United Kingdom.

Canned sardine exports in 1957 fell to $2.7 million in 1957, a decline of $3.8 million. Most of this drop was sustained in decreased shipments to the Philippines.

Canned mackerel exports in 1957 were valued at $2.1 million; canned anchovy exports were also about this level. Canned mackerel exports were $1.8 million above their 1956 level, almost entirely accountable to increased shipments to the Philippines.

During 1957 canned shrimp exports were valued at $2.4 million, down slightly from 1956; frozen shrimp exports amounted to $1.5 million, a small gain from the previous year.

* * * * *

VALUE OF IMPORTS OF FISHERY PRODUCTS AT NEW HIGH IN 1957: A new record value for fishery products imported into the United States was reached in 1957 when products valued at $297 million (at the foreign port of shipment) exceeded those of 1956 by 4 percent. Since 1950, there has been an increase of 50 percent in the annual value of fishery imports.

Although a new high in the value of imports was attained in 1957, the quantity was second largest on record, about

Table 1 - Value of United States Imports of Fishery Products, by Principal Country of Origin, 1956 and 1957

Country	1957	1956
	($1,000)	
All Countries	297,443	281,197
Canada	97,404	95,483
Japan	77,202	70,800
Mexico	25,248	27,815
Norway	11,144	13,620
Peru	9,167	7,320
Union of South Africa	8,554	8,039
Panama	6,291	4,247
Cuba	6,282	5,814
Iceland	6,022	6,200
Portugal	5,507	4,906
Denmark	3,463	2,887

1.1 billion pounds. This was greater than the quantity received in 1956 but considerably less than the quantity imported during the record year 1952, when imports of fish meal were about 2-1/2 times those of 1956.

Fishery products imported for food purposes increased to a new record level of 884 million pounds (valued at $251 million) during 1957, surpassing the previous record year of 1954 by 80 million pounds, and of 1956 by nearly 100 million pounds.

Although the total value of fishery imports rose for the eighth consecutive year, the value of non-food products fell to $46.5 million in 1957, the lowest value since 1950. This decrease resulted from reduced fish meal imports, which reached a four-year low value of $9.4 million in 1957.

The United States is the world's leading importer of fishery products. Imports of groundfish fillets contributed about 59 percent of the groundfish used in the United States during 1957; 36 percent of the tuna used in canning, 16 percent of the canned tuna, 42 percent of the lobsters, 35 percent of the shrimp consumed, 14 percent of the canned salmon, and 24 percent of the fish meal.

Trends by Countries: During 1957, Canada, Japan, and Mexico, supplied products which made up two-thirds of the total value of all fishery imports.

Canada, the primary source, supplied products valued at $97.4 million at the foreign port of shipment, an increase

of almost $2 million from 1956. Among the many products from Canada were frozen fillets, frozen and canned salmon, fresh-water fish, and fish meal.

Japan was second in value with products worth $77.2 million, an increase of $6.4 million from 1956. During 1957, 44 percent of the value of fishery products emanating from Japan consisted of tuna. Canned crabmeat, frozen and canned salmon, canned oysters, and pearls were other important products.

Mexico supplied products valued at $25.2 million, a decline of $2.5 million from 1956, owing to reduced shipments of frozen shrimp. Imports from other Latin American countries totaled $30.7 million.

Products imported from Norway were valued at $11.1 million, a $2.5 million drop from 1956. Peru supplied products valued at $9.2 million; the Union of South Africa, $8.6 million; Panama, $6.3 million; Cuba $6.3 million; and Iceland $6.0 million.

Trends by Commodities: Valuewise, fresh or frozen lobsters were the leading item in the import trade, contributing $36.8 million dollars to the exchange balance of the countries supplying this product. Fresh or frozen shrimp (including some canned and dried) was next in value with imports valued at $35.4 million. Groundfish and ocean perch fillets and blocks were third with $25.7 million, followed by canned tuna valued at $17.0 million and frozen tuna, $16.8 million.

Table 2 - Value of United States Imports of Selected Fishery Products, 1956 and 1957 1/

Commodity	1957	1956
	($1,000)	
Total Imports	297,443	281,197
Fresh or frozen:		
Lobsters	36,827	34,285
Shrimp	35,415	32,986
Tuna	16,765	15,337
Groundfish and ocean perch fillets and blocks	27,417	25,987
Canned:		
Salmon	9,470	11,650
Sardines	8,957	7,110
Crab meat	6,254	5,318
Lobster	5,017	5,031
Tuna	17,002	14,998
Salted cod, haddock, hake, pollock, and cusk	5,587	5,858
Pearls	9,989	8,651
Fish meal	9,717	11,518

1/ Value of the foreign port of shipment.

Duties Collected: Duties collected on United States imports of fishery products during 1957 totaled nearly $16.0 million.

Wholesale Prices, October 1958

Price trends for fishery commodities from September to October this year were mixed over a narrow range, but from October 1957 to October 1958 wholesale prices for some products were sharply higher. The October 1958 edible fish and shellfish (fresh, frozen, and canned) wholesale price index (129.6 percent of the 1947-49 average) was down slightly (only by 0.4 percent) from the previous month. But it was up 8.6 percent when compared with October a year ago.

Prices in mid-October 1958 for the drawn, dressed, and whole finfish subgroup were 1.3 percent higher as compared with September. An increase of about 3 cents a pound in fresh and frozen salmon prices more than offset the drop in prices for frozen halibut, fresh-water fish, and large drawn haddock. As compared with October 1957, the subgroup index this October was up 19.3 percent due primarily to higher prices for fresh haddock (up 26.3 percent), fresh and frozen West Coast salmon (up 12.1 percent), and Great Lakes yellow pike (up 15.7 percent). But wholesale prices this October were lower for frozen halibut (down 3.1 percent) and Lake Erie whitefish (down 7.3 percent) compared with the same month of 1957.

The fresh processed fish and shellfish subgroup index for October 1958 was down 2.1 percent from September. Higher fresh haddock fillet prices (up about 7.5 percent) were more than offset by a 5.1-percent drop in fresh shrimp prices. The index this October when compared with October 1957 was higher by 5.2 percent due to a 28.2-percent increase for haddock fillets and a 7.0-percent increase in fresh shrimp prices.

The index for frozen processed fish and shellfish declined 1.2 percent from September to October this year due to a drop of 3.7 percent in wholesale shrimp prices at Chicago.

Fig. 1 - Buyer examining fresh West Coast halibut at Fulton Fish Market, New York City.

Fig. 2 - Barrels of bagged scallops ready for market. Scallop dragger being prepared for next trip at Fulton Fish Market, New York City.

That drop was partially offset by higher frozen fillet prices. This subgroup price index this October was up 11.6 percent as compared with the same month of 1957 because prices for all items in the subgroup were up from 42.0 percent for frozen haddock fillets to only 0.3 percent for frozen shrimp. Ocean perch fillet prices were up by 11.0 percent and flounder fillets by 7.7 percent.

Canned fishery products prices in October this year were about unchanged from the preceding month, but were 2.1 percent above October 1957. From September to October this year an increase of 3.6 percent in pink salmon prices just about offset a drop of 18.8 percent in California sardine prices. Higher prices for canned Maine sardines (up 27.4 percent), canned light meat tuna (up 4.4 percent), and California sardine (1.2 percent) resulted in a 2.1-percent increase in the subgroup index from October 1957 to October this year. During the same period canned salmon prices were down about 5.4 percent. The packing season for Maine sardines and Pacific salmon was about over by the end of October, but tuna canning continued at a record level and the California sardine pack increased so rapidly that it has created a serious marketing problem.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1958 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Oct. 1958	Sept. 1958	Oct. 1958	Sept. 1958	Aug. 1958	Oct. 1957
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					129.6	130.1	129.9	119.3
Fresh & Frozen Fishery Products:					149.2	150.0	147.2	133.1
Drawn, Dressed, or Whole Finfish:					160.2	158.1	152.7	134.3
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.15	.15	149.0	151.9	113.7	118.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.37	106.2	113.2	114.5	109.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.81	.78	182.6	174.2	178.7	162.9
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.65	.65	161.1	161.1	132.6	158.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.90	2/.99	182.0	200.2	177.0	197.2
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.59	.60	138.4	140.7	179.4	119.6
Processed, Fresh (Fish & Shellfish):					140.8	143.8	142.4	133.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.50	.47	170.1	158.2	131.0	132.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.83	.88	131.1	138.2	143.8	122.5
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	142.3	148.5
Processed, Frozen (Fish & Shellfish):					133.1	134.7	133.6	119.2
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.41	108.6	107.3	106.0	100.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.41	.40	127.1	124.0	109.9	89.5
Ocean perch, skins on, 1-lb. pkg.	Gloucester	lb.	.30	.29	120.8	116.8	114.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.83	.87	128.5	133.5	137.3	128.1
Canned Fishery Products:					101.8	101.9	105.7	99.7
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.75	21.00	113.5	109.6	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.95	11.95	86.2	86.2	86.2	82.6
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	4.30	5.30	100.4	123.7	132.4	99.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.22	8.22	87.5	3/87.5	82.2	68.7

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/ Revised.
3/ Revised.

International

FOOD AND AGRICULTURE ORGANIZATION

REPORT ON MEETING ON COSTS AND EARNINGS OF FISHING ENTERPRISES:

The first international meeting on Costs and Earnings of Fishing Enterprises, called by the Food and Agriculture Organization of the United Nations (FAO), was held in London, September 8-13, 1958. Experts from 20 countries attended and discussed technical papers dealing with the various problems, questions, and investigations concerned with costs and earnings in the fishing industries of their countries.

The meeting focused attention on many questions of crucial interest to all sections of the world's fishing industries. It is of special interest to governments which are deeply involved financially in the maintenance and development of fishing industries. Subsidies, credit schemes, tax and duty concessions, port and shore facilities, insurance, price support and marketing schemes, are some examples of Government participation in the fishing industry.

The interest of the fishing industry itself has led to much investigation of costs and earnings, especially in the countries possessing important and highly developed fishing industries. But there has been little collaboration or exchange of ideas and information between the investigators, so they have not benefitted from each other's work. The meeting enabled the experts to exchange views and experience and discuss the methods used to study the subject in various countries.

The problems and difficulties encountered in the investigation of costs and earnings in the fishing industries are in themselves a hindrance to the rational development of fisheries. The meeting should do much to point the way in many countries towards finding the facts about costs and earnings and should help to make possible the planning of realistic programs for the development of fisheries on a sound economic basis.

Represented at the meeting were Belgium, Canada, Denmark, El Salvador, Finland, France, German Federal Republic, Ghana, Guatemala, Iceland, Ireland, Italy, Malaya, Netherlands, Norway, Poland, Portugal, Sweden, Turkey, Uganda, United Kingdom, United States, and FAO.

The first item of the agenda was concerned with the interest of government authorities and of those in the fishing industry in studies of costs and earnings. Most of the representatives present had participated in the discussion and it was clear that costs and earnings studies were necessary for a great variety of purposes. Many were related to government intervention in the industry, both with the object of enhancing the welfare of fishermen and others working in the industry and with the regulatory functions of government. In some cases there were statutory requirements to be met; in others the results of costs and earnings studies were required to develop government policy and to judge success in its implementation. Use of costs and earnings studies in connection with managerial decisions within fishing enterprises and other relations within the industry such as, for instance, price share and wage agreements, was not yet as well developed as the governmental use of these studies. There was general agreement that such studies need to be designed with a specific purpose firmly in mind. With regard to methods used in studying costs and earnings, there were considerable differences between fisheries conducted mainly by small boats skippered by their owners and those using large vessels, normally owned by corporations, particularly in highly-developed long-distance fisheries.

Discussion of concepts, definitions, and conventions used in inquiries into the costs and earnings of fishery enterprises occupied the meeting for a considerable time and brought to light a number of problems encountered in various countries. Among them was that of defining a fishing enterprise, the allocation of earnings between fishing and other activities in mixed enterprises, and the treatment of such cost items as depreciation, interest, and insurance. There was general agreement that a more standardized approach to these concepts would be highly desirable, and the suggestion was made that FAO should, in conjunction with experts from the various countries concerned, work out proposals in this regard for eventual discussion by a similar meeting of experts.

The meeting next dealt with the respective merits of different methods of investigation used in studies of costs and earnings of fishing enterprises. Participants related their experience with both continuing and periodic studies, and discussed the advantages and disadvantages of entrusting the conduct of such studies to government agencies, industry organizations and universities, and research organizations.

The methods to be used in the analysis of the results of studies of costs and earnings were the subject matter for the sessions this morning. The last business session of the Conference discussed a paper on the effect of fishery regulations on costs and earnings of fishing enterprises. It was con-

International (Contd.):

cluded that, in the past, fishery regulations had been framed mainly with a view to their biological efficiency and ease of administration; and that development of costs and earnings studies and joint analysis of their results by biologists, administrators, economists, and fishing operators might make it possible to take more account of the effect of these regulations on the operating results of fishing enterprises.

The following 22 papers were submitted by the various delegates attending the meeting:

1. Purposes of Costs and Earnings Studies in Fisheries: The Government's Point of View (W. C. MacKenzie, Canada).

2. The Need and Value of Costs and Earnings Studies in the Fishing Industry as Basis of Government Action in the United States (R. A. Kahn, United States).

3. Costs and Earnings in the West German Deep Sea Fishery (G. Meseck, Germany).

4. Research on Commercial Fishing Industry Costs and Earnings in the United States (W. H. Stolting and A. T. Murray, United States).

5. Costs and Earnings Studies in Fisheries in the Netherlands (A. G. U. Hildebrandt, Netherlands).

6. Fundamental Activities of the State in Polish Fisheries (S. Laszczynski, Poland).

7. The Point of View of Governments and Other Public Authorities (Ministry of Agriculture, Fisheries and Food, and Scottish Home Department, United Kingdom).

8. Analysis of Costs and Earnings in Polish Fisheries (B. Noetzel, Poland).

9. The Collection of Data Related to the Costs and Earnings of British Herring Catches (Herring Industry Board, United Kingdom).

10. Concepts, Definitions and Conventions in Present Inquiries (Ministry of Agriculture, Fisheries and Food, and Scottish Home Department, United Kingdom).

11. Concepts, Definitions and Conventions in Costs and Earnings Studies of the Fisheries Industry (C. C. Osterbind, United States).

12. Costs and Earnings of Fishing Enterprises in Canada: Concepts, Definitions and Conventions (J. Proskie, Canada).

13. Statistical Information Required by Commercial Fishermen of British Columbia on Costs and Earnings of Fishermen and Fishing Enterprises (United Fishermen and Allied Workers' Union of British Columbia, Canada).

14. Concepts, Definitions and Conventions (E. S. Holliman and A. E. Ovenden, United Kingdom).

15. Method and Enforcement of Costs and Earnings of Fisheries Industry in Japan (Matsuya Onda, Japan).

16. Merits of Different Kinds of Investigational Methods (E. S. Holliman and A. E. Ovenden, United Kingdom).

17. Methods of Analysis of Collected Accounts (E. S. Holliman and A. E. Ovenden, United Kingdom).

18. Interpretation of Detailed Statistics (K. O. H. Michielsen, Belgium).

19. Statistical Analysis of Costs and Earnings in the Fishing Industry (A. G. U. Hildebrandt, Netherlands).

20. Statistical Techniques for the Analysis of Costs and Earnings (A. Zellner, United States).

21. Types of Fishery Regulation and Some Economic Implications (R. J. H. Beverton, United Kingdom).

22. Costs and Earnings Studies in Fisheries in Denmark: Concepts, Definitions and General Conclusions (S. N. Sorensen, Denmark).

Note: Also see Commercial Fisheries Review, July 1958, p. 52.

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WORLD MEETING ON SARDINE BIOLOGY SCHEDULED FOR 1959:

A World Scientific Meeting on the Biology of Sardines will be held at Food and Agriculture Organization (FAO) Headquarters in Rome, Italy, from September 21 to 28, 1959.

The holding of this meeting next year was proposed by scientists of several countries concerned with sardine research, who considered that the time had arrived to have an international gathering for the discussion of common problems concerned with the biology of sardines and their environment.

A Prospectus, issued by FAO, gives an agenda, program, some details of these problems, a full explanation of why such a meeting is regarded as necessary, and the results expected of it.

The meeting should bring together not only Government participants, but scientists and other persons from private institutions engaged in the study of the biology of sardines and their environments, their commercial fisheries, and the effect of those fisheries on the sardine stocks. Special attention will be given to the problem of fluctuations of sardine populations and catches. It is expected that the meeting will make recommendations for future international cooperation in forecasting fluctuations and how such cooperation could be made possible. Participants are expected to present written contributions for discussion and these, subject to decisions of the meeting, may eventually be printed.

The proposed program of the meeting includes these subjects for discussion: (1) Past and present techniques of studying fluctuations in the size of sardine populations. (2) Review of fluctuations in catches of sardines and their possible causes. (3) Possible future approaches to the study of fluctuations in catches of sardines. (4) Recommendations for future international cooperation in forecasting and means whereby such cooperation could be made possible.

Further details may be obtained from H. Rosa, Jr., Secretary, World Scientific Meeting on the Biology of Sardines, Fisheries Division, FAO, Rome, Italy.

International (Contd.):

GENERAL AGREEMENT ON TARIFFS AND TRADE

ANNUAL SESSION REVIEWS IMPORT RESTRICTIONS:

The 13th Session of the General Agreement on Tariffs and Trade (GATT) opened in Geneva on October 16, 1958. The session was expected to continue for four to six weeks. The GATT is recognized as a basic instrument governing commercial relations between the United States and the principal trading nations of the free world.

Harry Shoeshan, International Activities Assistant, Technical Review Staff, represented the U. S. Department of the Interior on the United States delegation as an adviser for fishery and other matters of Departmental interest.

Of particular concern to American trade circles are this year's consultations with countries that are still imposing import restrictions to safeguard their balance of payments. These consultations, proposed by the United States, are intended to explore the need for and the methods used in applying quantitative restrictions. The views of United States exporters were invited in August 1958, so that the delegation would be fully informed of their trade problems. By discussion of this subject at the GATT, the United States seeks to reduce discrimination against American exports and to promote greater freedom of trade.

At a GATT meeting that ended May 2, 1958, the six signatories to the Rome Treaty that established the European Economic Community (Common Market) agreed to consult with countries that were concerned over the possible effects of that Treaty on international trade. Discussions on this subject were also expected to be undertaken during the current GATT session.

Other matters, such as customs administration, disposal of agricultural surpluses, and primary commodity situations, were reviewed by the Contracting Parties during the current session.

Note: Also see Commercial Fisheries Review, July 1958, p. 52.

INTERNATIONAL FISH MEAL MANUFACTURERS CONVENTION

Representatives of the fish meal industries of Great Britain, Norway, Belgium, France, Denmark, Holland, Spain, and Iceland gathered in Cape Town, South Africa, in November for the International Fish Meal Manufacturers Convention. About 25 delegates were expected to attend the convention, which met from November 16-18, 1958.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

ELECTRIC BARRIER AT ADAMS RIVER MOUTH TO DIVERT POOR-QUALITY SOCKEYE SALMON SPAWNERS:

An electric sockeye or red salmon diverter was ordered installed at the mouth of the Adams River, subject to approval of the Canadian Government, by the International Pacific Salmon Fisheries Commission in an emergency session on October 29, 1958.

A proper escapement of about 1,750,000 top-quality spawners had been obtained and late migrating fish of poor-quality were starting to arrive. "This unprecedented action appears essential if we are to forestall a serious decline in the returning run in 1962," the chairman of the Commission said. Field reports indicated that a major share of the late-run sockeye salmon would never reach the spawning grounds but would die either en route or in the side tributaries where they were stopping because they had run out of body energy. Thousands of Adams River sockeye were sighted in Spuzzum Creek, 10 miles below Hell's Gate Gorge, and others were seen in streams as far down the Fraser River as Maria Slough, near Agasciz, British Columbia.

The Commission heard staff reports that, despite the large natural mortality of late sockeye en route to the Adams River, a serious danger existed from those that tardily arrived to spawn in the already adequately seeded areas of the Lower Adams River. It was estimated that the fence would be in operation this weekend and that the latecomers would be diverted to the gravel beaches of Shuswap Lake where they could do no harm.

LAW OF THE SEA

IRELAND SIGNS CONVENTIONS:

Ireland on October 2 signed the four international conventions which were adopted by the United Nations Conference on the Law of the Sea in Geneva last April. The Irish Minister for External Affairs signed the documents in the office of the United Nations Legal Counsel.

International (Contd.):

Ireland became the 24th nation to sign the Convention on the Territorial Sea and the Contiguous Zone. This Convention was previously signed by Argentina, Canada, China, Colombia, Costa Rica, Cuba, Denmark, Dominican Republic, Ghana, Guatemala, Haiti, Holy See, Iceland, Iran, Israel, Liberia, Nepal, Panama, Thailand, United Kingdom, United States, Uruguay, and Yugoslavia.

Ireland is the 27th signatory of the Convention on the High Seas. This Convention was previously signed by Argentina, Canada, China, Colombia, Costa Rica, Cuba, Denmark, Dominican Republic, Ghana, Guatemala, Haiti, Holy See, Iceland, Indonesia, Iran, Israel, Lebanon, Liberia, Nepal, Panama, Switzerland, Thailand, United Kingdom, United States, Uruguay, and Yugoslavia.

Ireland is the 24th nation to sign the Convention on Fishing and Conservation of the Living Resources of the High Seas. This Convention was previously signed by Argentina, Canada, China, Colombia, Costa Rica, Cuba, Denmark, Dominican Republic, Ghana, Haiti, Iceland, Indonesia, Iran, Israel, Lebanon, Liberia, Nepal, Panama, Thailand, United Kingdom, United States, Uruguay, and Yugoslavia.

Ireland is the 25th signatory of the Convention on the Continental Shelf. This Convention was previously signed by Argentina, Canada, China, Colombia, Costa Rica, Cuba, Denmark, Dominican Republic, Ghana, Guatemala, Haiti, Iceland, Indonesia, Iran, Israel, Lebanon, Liberia, Nepal, Panama, Thailand, United Kingdom, United States, Uruguay, and Yugoslavia.

MARINE OILS

WORLD EXPORTS EXPECTED TO BE LOWER IN 1958:

Exports of marine oils in 1958 by the major producing countries will fall short of the 1957 year's volume chiefly because of Norway's poor 1958 herring catch. The expected trade in whale oil, which continues fairly constant from year to year, reflects largely the restrictions on the Antarctic pelagic catch imposed by the International Whaling Agreement. An increase in the exports of sperm oil is likely because of the increased sperm whaling in the Antarctic prior to the regular 1957/58 whaling season (Foreign Crops and Markets, September 25, 1958).

NORTHWEST ATLANTIC FISHERIES COMMISSION

EIGHTH ANNUAL MEETING REPORT:

Research into the vast fishery resources of the Northwest Atlantic--with particular emphasis on gathering "on-the-spot" data--will be accelerated by scientists of the 12 nations which make up the International Commission for the Northwest Atlantic Fisheries. The vessels of those nations fish in the nearly one million square miles of water comprising the Atlantic fishing area in which the Commission has supervisory responsibility. That was one of the main decisions by delegates of member countries attending the Eighth Annual Meeting of the Commission in Halifax in June 1958.

This year marked the official welcoming of West Germany and Russia as full partners to the 12-nation Convention. West Germany signed the Convention in 1957, while Russia became a signatory this year. The Commission now embraces Canada, Denmark, France, Iceland, Italy, Norway, Portugal, Spain, Union of Soviet Socialist Republics, United Kingdom, the United States, and the German Federal Republic.

The Canadian Minister of Fisheries pointed out that the fish resources of the Northwest Atlantic were a most valuable and important source of protein food and there was a serious responsibility, on all nations that fish in this area, to make certain that the resources were maintained and even expanded for future generations.

The Commission area encompasses the marine expanse, except territorial waters, from Rhode Island in the south to the west coast of Greenland in the north, and east to the 42nd meridian. This area is divided into five subareas, each having a panel consisting of the member nations which fish in it. One of the main aspects of the meeting was the discussion of the panel groups.

Panel I discussions were held under the chairmanship of Portugal. Other countries participating were Denmark, France, West Germany, Iceland, Italy, Norway, Spain, United Kingdom, and the U. S. S. R.

The Norwegian Commissioner told members that his country was also ready to step up its research work in the panel area, which includes West Greenland waters. Norway's new research vessel would be of great assistance in increasing the research effort, he said. France reported it planned to send observers aboard fishing vessels operating in the area. Denmark urged the collection of fullest information on tagging recaptures in time for inclusion in yearly research reports.

Acting Chairman of Panel 2--waters off the east coast of Labrador--was the Canadian Commissioner. Besides Canada, other countries represented on the panel were France, Italy, Portugal, Spain, and the U. S. S. R.

The panel's report noted that cod was the only species fished substantially in that area. While it was felt that progress had been made in sampling cod fisheries in the offshore waters, there had been no recent sampling of stocks from inshore waters. In 1938 the inshore cod fishery produced 78,000 metric tons of cod as opposed to only 12,000 tons in 1957. The catch for the whole area in 1957 was 32,000 tons.

The report stated: "This creates a situation where, because of the presumed increase in nu-

International (Contd.):

merical substance of cod through lack of a fishery, there may be a decrease in the growth rate. Studies to determine this would be extremely valuable."

The panel report noted that Canada is doing work on ocean perch distribution in the Hamilton Inlet Bank area and that this work would be expanded when the new research vessel gets into operation. It was generally felt that knowledge of the area would certainly increase with the addition of the new Canadian research vessel, and of the research vessels now in the planning stage for France, Portugal, and Spain.

Fishing grounds south and east of Newfoundland (including the Grank Bank) comprise the Panel 3 area. Canada, France, Italy, Portugal, Spain, U. S. S. R., United Kingdom, and United States are members.

The report of the panel's scientific advisers stated that while considerable progress had been made in collection of data on the sizes and ages of haddock and cod "landed," there was need for more sampling of sizes and ages of those species "caught" to supplement the landing information from the area.

On the subject of increased research the panel was told Canada would enlarge its program of commercial sampling when more staff became available. France will have one or two observers on her fishing vessels next year, while Spain will continue to take samples from her commercial craft.

Discussing the study of selectivity of gear other than otter trawl, the panel believed more information was necessary and that direct experiments should be carried out, where possible, for comparing relative sizes of fish caught by different types of fishing gear fishing the same grounds at the same time.

Mesh sizes formed an important topic in discussions in Panels 3 and 4. The latter panel has to do with fishing grounds adjacent to the Maritime Provinces. On this subject a report elaborated on the effect of larger-size meshes on both cod and haddock.

The Canadian investigators reported that long-term observations of landings and fishing effort on the Georges Bank area provided an excellent background for the assessments of the effect of the $4\frac{1}{2}$-inch mesh on the fishery. It was already clear, the report stated, that the numbers of haddock discarded at sea had been reduced to negligible proportions of the total catch. It had also been demonstrated that more large haddock were caught with the same amount of fishing effort, because of the efficiency of large-mesh nets. However, the report added, investigations of changes in the quantities and sizes of fish caught and landed must be continued for several years before it could be established definitely whether or not stocks of fish of commercial size have been increased as a direct result of mesh regulations. Since the minimum mesh size only became effective on Canadian vessels last year in the Gulf of St. Lawrence area, the effects of mesh regulations are just beginning to appear.

Since the end of World War II, it was reported, otter trawling has become the dominant method of fishing for groundfish along the southwestern Atlantic coast. As a result of this conversion from line fishing to otter trawling, a more continuous supply of fish is now caught with less work by fishermen. Otter trawls outfish baited hooks, mainly because they catch small-mouth as well as large-mouth groundfish. The greater catches include not only added species, such as small-mouth ocean perch and flounders but also smaller sizes of larger-mouth species, such as cod and haddock. While otter trawling is efficient, it can be wasteful. Large quantities of fish have had to be discarded at sea because they were unmarketable. The latter was particularly true for small sizes of haddock and cod. Commonly, half the catch by numbers has been discarded as dead or dying fish from the decks of otter trawlers.

The practice of catching and discarding small fish was wasteful in two ways, the report continued. Firstly, fishing operations were less efficient than they should be, and, secondly, the destruction of small fish led to reduced landings of marketable sizes in later years.

Canada and the United States--the only countries holding Panel 5 (waters off New England) membership--focused attention on the Georges Bank scallop fishery. The bank is the biggest offshore scallop resource on the Atlantic coast. United States fishermen in 1957 landed about 20 million pounds from operations in the area, while Canada landed about 1.8 million pounds, nearly half its 1956 total. The panel described the fishery as of "great and growing economic importance to the United States and Canada and on this basis alone deserves the serious consideration of the Commission."

Two main recommendations, both endorsed by the Commission, resulted from discussions on scallops:

1. That routine samples for abundance should be taken year after year with the same vessel or vessels and gear so that experimental measures of catch per unit of effort will not be affected by variations in fishing power.

2. That serious consideration be given the need for use of a research vessel of fishing power similar to those now engaged in the commercial fishery. The committee felt that the data required to support and follow up the effect of a regulation are sufficiently important to justify such a step.

A main point in the scallop discussion was whether it was advisable at this time to regulate sea scallop fishing. While the scientists agreed that the time wasn't ripe to implement large ring sizes in scallop gear, they unanimously agreed that more study be given the subject.

Montreal has been selected as the site for the 1959 meeting of the International Commission for the Northwest Atlantic Fisheries.

International (Contd.):

The Soviet Union's scientific spokesman described research carried out by his country in the Convention area and indicated that this was to be increased this year. Three trawlers, Odessa, Kreml, and Novorossiysk will carry out research work in the regions of the Grank Banks, Flemish Cap, Labrador, and along the western coast of Greenland. Soviet fish landings from the two banks off Newfoundland in 1957 totaled 70,000 metric tons. Two 1,800-ton trawlers were employed. The catch was divided between 19,200 tons taken on the Grand Banks and 50,121 tons on Flemish Cap.

The report of the Research and Statistics Committee incorporated recommendations of the various subcommittees under specific headings. Some of the main recommendations were:

Statistics Collection and Analysis: The Committee recommended that the biologist-statistician commence his work next year of analyzing the statistics now provided by the Commission to assess more precisely their value for current research needs, especially in population studies.

Sampling: The Committee recommended that all countries should engage sea observers to accompany commercial vessels fishing in the Convention area to provide data on fish for each of the statistical areas fished. Such data would include information on length and age of the entire catches, including the fish discarded as well as those retained.

Ocean Perch: The Committee recommended that the symposium on Ocean Perch Systematics and Biology, approved at the Commission meeting in 1957, should be held in Copenhagen in September 1959. Solutions of the problems of fundamental systems and biology were described as of major importance for accurate assessments of population dynamics of ocean perch stocks.

Gear Selection: Calling attention to gaps in knowledge of gear selection in the Convention areas, the committee recommended that gear selection research should be placed on the agenda of the next meeting of the Committee to devise means for filling these gaps.

Marking Techniques: Considering that the stage has been reached for a collective assessment of the marking methods used in the Convention area and of the experiences of workers elsewhere, the committee recommended that a symposium on marking should be held when the Commission meets next year.

Assessment of Current and Possible Future Mesh Regulations: Noting that experiences since the introduction of mesh regulations in the subarea 5 haddock fishery have shown that the regulation has achieved its short-term objectives and that most of the predictions of benefit made prior have been realized, the Committee recommended that United States scientists should continue to pursue this measurement using hitherto untried methods; that the licensing of small-mesh study boats be held in abeyance, and that the United States should consider increasing the size of mesh used in the Georges Bank haddock fishery to allow the release of haddock to the age of three years.

Research on Sea Scallops: The Committee recommended that investigations of the population dynamics of the exploited scallop stocks, now in progress in the United States and Canada, be continued and expanded. It recommended in particular that: (1) catch and improved effort statistics for the Canadian and United States vessels fishing in the area be collected for as small time and area subdivisions as are practicable; (2) consideration be given to measuring catch and effort of a selected portion of the commercial fleet and to the use of a special research vessel to improve understanding of factors influencing the catch per unit of effort; (3) tagging experiments be undertaken for estimating mortality; (4) experimental fishing including underwater photography and television be conducted to measure catching efficiency of the gear and to estimate fishing mortality; (5) research on the biology of the scallop and on the environment to determine elements influencing occurrence, behavior, and survival be instituted.

Environmental Studies: The identification and measurement of the effects of fluctuations in plankton and hydrographic factors on the distribution and abundance of exploited fish stocks are fundamental facets of applied fishery biology investigations. Hitherto, the extent of plankton and hydrographic studies in the Convention area has been limited and generally inadequate for achieving these aims.

The Committee considered that there should be a serious stocktaking of current progress and future requirements in these studies. It recommended that: (1) A survey should be made of present information on plankton in the Convention area; (2) that participating countries bring plankton specialists to the next annual meeting to plan a coordinated Convention area plankton program; (3) that present programs of environmental studies should be continued, and if possible intensified, in anticipation of the development of a fully coordinated Commission program.

TERRITORIAL WATERS

FAROES REJECT BRITISH PLAN TO RESOLVE CONFLICT OVER 12-MILE FISHING LIMITS:

The Faroe Islands have rejected Britain's "six plus" fishing proposal, according to a September 24, 1958, report from Thorshavn and Copenhagen. Britain proposed a six-mile fishing limit and a further six-mile belt in which fishing could go on by special arrangement. The five political parties in the Faroes reiterate their claim to a 12-mile limit, the report stated. They do not, however, oppose new negotiations between Denmark and Britain for a new agreement superseding the 1955 Anglo-Danish agreement.

The Faroes local government will consider appointing representatives to help

International (Contd.):

the Danish delegation in new negotiations with Britain. Denmark manages Faroes' foreign affairs.

Argentina

DEVELOPMENT OF TUNA CANNING INDUSTRY IN PROSPECT:

The recent discovery of schools of tuna in South Atlantic waters near Argentina has caused speculation that the Argentine fishing industry is on the verge of taking a great step forward, points out the Buenos Aires La Nacion of June 12, 1958.

The Mar del Plata area is the principal fishery center of Argentina because it has the largest number of vessels, the greatest amount of fishery landings, the greatest number of canneries, and the facilities for processing fishery products. Despite all this, the financial situation of the fishing industry of Mar del Plata is not good. The increases in the costs of containers, raw materials, salaries, and other operating expenditures have seriously hurt the canneries financially.

Tuna were found by the fishing vessel Foca during a cruise on February 27, 1958. Soon after that, reports were made to the Director of Fishery Investigations of the Argentine Ministry of Agriculture, and a second trip was made by the Foca with good results. The catch of the Foca was processed locally with good results.

From French technical studies, it was ascertained that "white" tuna in the South Atlantic spawned in the area east of Pernambuco (Brazil), then after remaining for a time in the area of their birth, the young tuna migrated in a perimeter of approximately 1,000 miles before starting their migration towards the east and eventually as far as South Africa.

Speaking of the promising aspects of a tuna industry, the President of the Mar del Plata Chamber of Fishery Industrialists stated that tuna occupied one of the most important places in the exports of various nations. He further stated that the local production of good-quality olive oil places Argentina in a very advantageous position in regard to canning tuna, since other nations of the Americas lack this important ingredient. For this reason, he added, it is a certainty that the tuna industry will develop into an important source of much-needed wealth for Argentina. If it is possible, he continued, to catch tuna during June-September, the canneries of Mar del Plata--which are usually idle during this season due to a scarcity of fish for canning--could remain active during the winter.

A member of Argentina's Honorary Fishery Commission, manifesting optimism of the effects of a tuna industry upon the economy, recalled that Peru, in little more than two years, has developed its fishing industry considerably. He further stated that it should not be forgotten that in recent years Argentina dropped from first place among the fishing nations of South America to its present position of fourth place, behind Chile, Peru, and Brazil.

In conclusion, he stated that the recent tuna finds permit the contemplation that once the local fishing fleet becomes adequate, tuna will become a sure and permanent source of wealth, due to the apparent proximity of the fishing grounds and the processing capacity of the Mar del Plata canneries.

The United States is considered to be one of the potential markets for Argentine tuna. The tuna industry provides a hope not only for the improvement of local industry, but also for aiding Argentina's economy.

According to local producers, the Government must facilitate exports of canned fish. This would eventually bring about improvements in fishing methods and the fishing vessels of the Mar del Plata area.

Belgium

IMPORTS OF JAPANESE CANNED SALMON, JANUARY-JULY 1958:

Imports of Japanese canned salmon into Belgium January-July 1958 amounted to about 2,811,000 pounds, valued at US$891,638, as compared with 4,545,000 pounds, valued at US$1,394,000, for the first six months of 1957.

Although total imports for the first six months of 1958 remain considerably below those for the same period in 1957, the months of May, June, and July, witnessed an over-all increase in the quantity and value of importations over 1957. This was, however, not sufficient to overcome the low level of imports during the first three months of 1958. The import figures for canned salmon are not broken down into pink or red salmon, but it is believed that the drop in imports occurred for all types.

Canada

DISEASE-RESISTANT OYSTERS TRANSPLANTED TO RESTORE DEPLETED BEDS:

The restoration of depleted oyster beds in New Brunswick and Nova Scotia is a current project of the Canadian Department of Fisheries and the Fisheries Research Board of Canada. Now in its second year it involves, over a three-year period, the transfer of 10,000 barrels of healthy, disease-resistant oysters from Prince Edward Island to areas of the two other Maritime Provinces where the species native to those districts has been almost wiped out by natural mortalities.

The second phase of the operation was carried out in May and June 1958 when 4,500 barrels of the Prince Edward Island oysters were transferred to the affected areas. Last year 1,500 barrels were transplanted, and 1959 will see the transfer of 4,000 barrels.

The plan of restoration is based on substantial evidence which shows that the circumstances causing the depletion in the two mainland provinces are similar to those which destroyed oyster stocks in the waters of Prince Edward Island between the years 1915 and 1920. Experience has shown that oyster stocks in devastated areas eventually recover if left to themselves over a period of from 10 to 15 years. However, the recovery period can be greatly reduced, in some cases cut in half, by introducing relatively small numbers of disease-resistant oysters. These serve as a breeding stock and their progeny inherit the immune characteristics of the parents. This device was used to rehabilitate the Prince Edward Island oyster fisheries and now all oysters in the waters of that Province are of the disease-resistant strain.

Fisheries scientists emphasize that the disease which caused the depletions of oyster stocks is not injurious to humans.

This year's operation involved the transplanting of oysters to the Shippegan, Miramichi Bay, Richibucto, Buctouche, and Cocagne areas in New Brunswick and the Merigomish-Pictou district of Nova Scotia.

The Department of Fisheries patrol vessel Cygnus carried oysters from the shipping point at Summerside, Prince

Canada (Contd.):

Edward Island, to the affected areas in Northumberland Strait. There the boxes of oysters--two boxes make up a barrel--were transferred to smaller boats of the Department's patrol fleet. The crews of these then scattered the oysters over specified areas.

The effect of the epidemic oyster disease has been disastrous, with mortalities in some of the affected areas running as high as 97.8 percent. Since the disease first became evident there has been a 70-percent drop in oyster production in New Brunswick and Nova Scotia. Last year the catch was only 9,000 barrels, and this year's production is expected to be less than half that amount.

Last year the Department began its first mass transfer of Prince Edward Island oysters--1,000 barrels to the Shippegan area and 500 barrels to the Wallace-Malagash district in Nova Scotia. Mortality to the end of 1957 was two percent in Shippegan and six percent in Wallace-Malagash. A Fisheries Research Board biologist considered these losses to be very low, saying: "We cannot be sure that these animals are disease-resistant but results of the 1956 resistance experiment give us good reason to think they are."

The Prince Edward Island oysters transferred to Malagash in 1957 spawned and a few spat were caught. These are being studied for disease resistance. The Shippegan lot did not spawn, but spawning failures are common in that area in cold summers and the summer of 1957 was cold throughout the Maritimes.

Encouraged by the results of last year's operation, the Department this year increased its planned transfers from the initially-proposed 3,500 barrels to 4,500.

The Board's biologist is of the opinion that by the end of 1959 most epidemics should have nearly run their course and all important diseased areas will have been planted with disease-resistant Prince Edward Island brood stock, in plantings dense enough to encourage vigorous spawning. If spatfall in all areas begins as soon after planting as it did in Malagash, it can be expected that there will be a great reduction in the recovery period, as compared with that in Malpeque Bay following the earlier Prince Edward Island outbreak, in which no rehabilitation effort was possible. The biologist says: "Early restoration of the commercial oyster fisheries is promising if the oysters encounter favorable years for reproduction. We estimate that with luck most fisheries should be producing again in 1965." (Canadian Department of Fisheries Trade News, August 1958.)

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EFFICIENCY OF ALUMINUM LOBSTER TRAPS STUDIED:
Further study of the efficiency of aluminum lobster traps is being continued following the opening of the lobster fishing season in Northumberland Strait on August 10. Thirty-four traps built of aluminum were set in the fishing grounds off Richibucto Cape, Kent County, New Brunswick.

Two fishermen are each fishing 17 traps. Records of catches will be kept and will be compared with the catches made by an equal number of the conventional wooden traps.

On the New Brunswick side of the strait the fishing area extends from Eel River in Kent County to Bergman's Point in Cumberland County, N. S., while on the Prince Edward Island side the fishing grounds extend from a point off the northern tip of the island to Victoria Harbour, Queens County.

The metal trap study off Richibucto was a prelude to a large-scale operation in the cold waters of the Bay of Fundy in the Yarmouth district this winter. There, 300 aluminum traps will be fished by three fishermen in a full-scale test of this type of gear. The traps are being provided by the Industrial Development Service of the Department of Fisheries, which instituted research into metal traps four years ago.

Technicians of the Fisheries Research Board of Canada at the Board's Technological Station at Halifax are now constructing a model of an improved aluminum trap to be used in the Yarmouth project. A total of 300 traps will be constructed after the model is tested for the large-scale study.

The ability of metal lobster traps to withstand punishment by sea and winds that would demolish wooden traps has been definitely established. That factor has been the main spur to the Department's program of investigating this new type of fishing gear. The metal traps to be used in the experiment are of the same design as the conventional wooden traps.

If the efficiency of the metal lobster traps in catching lobsters can be established definitely this winter, it would provide part of the answer to the heavy trap losses suffered by Canadian lobster fishermen. (Canadian Department of Fisheries Trade News, August 1958.)

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EXPORT BAN ON FRESH AND FROZEN SOCKEYE SALMON LIFTED UNTIL DECEMBER 31, 1958:

The export embargo on fresh and frozen sockeye salmon was lifted on October 2, 1958, for the remainder of the current season (until December 31, 1958) by the Canadian Department of Fisheries.

Since there was a large number of sockeye salmon at the entrance of the Fraser River, it may be found that the number is in excess of the optimum required for spawning purposes if all are allowed to go upstream, the Department pointed out. Should the International Pacific Salmon Fisheries Commission decide to reopen fishing, the temporary lifting of the export ban will provide the opportunity to export the anticipated surplus.

The action taken is in line with the procedure adopted under similar circumstances with the large run of Adams River sockeye in 1954.

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FRESH AND FROZEN FISHERY PRODUCTS INSPECTION PROGRAM EXPANSION ANNOUNCED:
An expansion of Canada's program of inspection of fresh and frozen fish products and of fish processing plants was announced by that country's Fisheries Minister on September 22, 1958. After January 1, 1959, the Canadian industry may offer the consuming public fish products which have been processed and packaged under rigid standards.

This announcement was made in the course of a speech during which the Fisheries Minister officially opened "National Fish Week" at a luncheon in Ottawa given by the Fisheries Council of Canada. He prefaced the statement of his Department's new plans by saying that encouraging progress had been made during the past three years in a voluntary program of inspection introduced in fish-processing plants in many parts of Canada. Before Department inspection will be given any fresh or frozen fish product under the new standards, processing plants must meet specific requirements pertaining to construction, sanitation, operation, and equipment. Once a plant has been approved any of its products, including round and dressed fish, fillets, steaks, fish sticks, and similar items will be eligible for inspection.

If a frozen fish product complies with clearly-defined quality, processing, and packaging specifications, the

Canada (Contd.):

packer may identify it with the designation "Canada Inspected" within a line drawing of a maple leaf marked on the wrappers, labels, containers or, where practicable, on the whole fish.

Inspected fish which is to be marketed in the fresh state as whole fish, fillets, or steaks may be identified by having the words "Processed under Government Supervision" within a line drawing of maple leaf marked on the wrappers, labels, or containers. There is no size limit on either of these designations.

Retail stores selling fish products bearing either of these two quality designations may publicize them by display advertising or other promotional aids. Necessary steps will be taken by the Department to ensure that the consumer will be protected against the purchase of improperly-labelled fish products.

The Department expressed its gratitude for the excellent cooperation and assistance which had been forthcoming from the fish-processing industry in all parts of Canada in drafting the standards and specifications for quality control. The standards were near completion, he added, and the Department's Area Directors across Canada would soon be able to give advice to those interested. Later, changes might be made from time to time in the light of experience gained in putting the improved inspection procedures into practice. Copies of specifications will be available from the secretary of the Canadian Government Specifications Board in Ottawa.

In concluding his reference to the proposed expanded inspection program, the Minister said "I feel certain that with this further step towards obtaining uniformity in the quality of our fishery products across Canada, coupled with the implications that it will have in promoting quality, the fishing industry will have stronger arguments than ever before in persuading the consumer that fish is for anyone--any time." He also expressed confidence in a favorable consumer response to what he described as a progressive step of making available in the retail stores both fresh and frozen fish products prepared under the most rigid sanitary requirements and which possess all the factors of high quality demanded by today's discriminating buyer.

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FRESH AND FROZEN FISHERY PRODUCTS INSPECTION PROGRAM EFFECTIVE APRIL 1, 1959:

Definite dates for plant approval and for product inspection on the new Canadian inspection service for fresh and frozen products have been announced. Detailed surveys of plants will commence on January 1, 1959, and the effective date of approval of plants which meet the plant requirements will be April 1, 1959. Consequently, no fresh or frozen fish products can be processed or packaged for sale, with the new quality designations, until April 1, 1959.

The specifications for plants and products are now being finalized and will be ready about November 1, 1958. These specifications, known as "32-GP-141a, Fish; Fresh, Frozen and Prepared," will be available from the Canadian Government Specifications Board, National Research Council, Montreal Road, Ottawa, at a nominal charge.

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PROSPECTS FOR 1958/59 BRITISH COLUMBIA HERRING FISHING SEASON:

The Fisheries Research Board of Canada Biological Station at Nanaimo, B. C., in July 1958 issued a prediction on the prospects for the 1958/59 British Columbia herring fishing season. A summary forecast of fishing success in the British Columbia herring fishing follows:

Subdistrict	Forecast	Size of Fish
Upper Queen Charlotte Islands (Area 2AE)	Catch expected to be small	No estimate
Lower Queen Charlotte Islands (Area 2BE)	Some increase in catch expected	Larger than in 1957/58.
Northern	No appreciable change in catch anticipated	Smaller than in 1957/58.
Central	Abundance at low level. No increase in catch expected and quota may not be taken. Fishing may be better in Area 6 than in 1957/58.	Relatively small, about the same as in 1957/58.
Upper East Coast	Little increase in abundance expected	Relatively small
Middle East Coast	The quota should be taken but not greatly exceeded	Smaller than in 1957/58.
Lower East Coast	More effort may be required to take quota. Abundance relatively low.	About the same as in 1957/58.
Lower West Coast	No improvement in abundance can be foreseen.	Smaller than in 1957/58.
Upper West Coast	Area 25 - abundance has decreased, no more than moderate fishing can be expected. Area 26-27 - expected to remain poor.	No estimate

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REGULATIONS CHANGED ON DRAINED AND NET WEIGHT OF FROZEN LOBSTER MEAT:

The drained-weight and net-weight requirements of frozen lobster meat in any container have been changed. The Canadian Government on the recommendation of the Minister of Fisheries ordered the change on August 18, 1958. Order in Council P. C. 1958-1145 revokes subsection (3) of section 68 of the Canned Fish and Shellfish and Cannery Inspection Regulations of the Meat and Canned Foods Act made by Order in Council P. C. 1954-1974 of December 16, 1954, as amended. The new section now reads:

Canada (Contd.):

"(3) The drained weight and net weight of frozen lobster meat in any container shall be:

"(a) $2\frac{1}{4}$ ounces net weight to be $1\frac{4}{5}$ ounces drained weight; (b) 6 ounces net weight to be $4\frac{3}{4}$ ounces drained weight; (c) 8 ounces net weight to be $6\frac{5}{8}$ ounces drained weight; (d) 14 ounces net weight to be $11\frac{3}{8}$ ounces drained weight; (e) 16 ounces net weight to be $13\frac{1}{4}$ ounces drained weight; (f) 70 ounces net weight to be $56\frac{7}{8}$ ounces drained weight; (g) 112 ounces net weight to be 89 ounces drained weight; and (h) 144 ounces net weight to be 133 ounces drained weight."

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SALMON INDUSTRY TRENDS FOR 1958:

The record sockeye salmon run with 50 percent of the fish coming through nonconvention waters off the north end of Vancouver Island dominated the Canadian west coast (British Columbia) fishing picture. The unexpected lifting of import restrictions by the United Kingdom made it possible for canners to market the bulk of the Canadian salmon pack in the United Kingdom.

Record Sockeye Catch: By far the most significant aspect of the current fishing season is the record-breaking sockeye salmon catch. This species of salmon returns every fourth year to spawn in the Fraser River and its tributaries. On the basis of current information it appears that the sockeye catch this year may exceed the previous record set in 1905. Over one million cases (48 1-lb. cans) were packed through mid-September which is double the pack of the last cyclical year of 1954. As a result the capacities of the canneries were taxed to the utmost and the fishing industry faced a problem of financing the record-breaking catch. On the basis of $35 a case, the canneries were required to finance $35,000,000 to process the sockeye catch.

The route the sockeye took in reaching the Fraser River created new and unexpected problems. In past years the sockeye have customarily passed through the Straits of Juan de Fuca en route to the Fraser River. This year, the sockeye salmon out-guessed the fish biologists and 50 percent passed through the north end of Vancouver Island and through the Johnstone Straits to their spawning grounds. This meant that one-half of the salmon migrated over a route which placed them outside of the convention waters set up by the International Pacific Salmon Fisheries Commission, permitting Canadian fishermen to catch this bonanza harvest without the necessity of dividing this additional catch with the United States fishermen according to the provisions of the Convention.

On September 12 an emergency meeting of the International Pacific Salmon Fisheries Commission was held at Bellingham, Wash., to explain the unusual fishing season. The Director of Investigations for the Commission pointed out that the change in the migratory pattern had imposed difficult problems in dividing the catch between United States fishermen and Canadian fishermen.

The Commission pointed out that equal catch division was brought about only by the imposition of rigid closure regulations on the Canadian fishermen while the Americans were permitted to fish seven days a week for a long period of time.

It was suggested that Canadian fishing efficiency was better than American fishing efficiency. For example, Canadian fishermen caught 2,868,477 fish in the Straits of Juan de Fuca as of that date as compared with half that number in 1954. The use of deep nylon nets was generally attributed as the reason for the Canadians' better harvest.

In order to properly provide for the 1962 sockeye catch, escapement at the right time of the proper number of fish must be permitted. Escapement of between 1.5 and 3.0 million sockeye is necessary to assure the success of the next cyclical season. Escapement of less than 1.5 million will not be sufficient to permit the reproduction of the harvest. Escapement of an amount in excess of 3.0 million will result in excess pressure in the spawning area with the deposit of poor salmon eggs over good ones to the detriment of the next cyclical catch. The Canadian fishing industry announced late in September that it would not buy any more sockeye since the late fish were of inferior quality and there is no market for them. This may cause serious complications in the management of the Fraser fishery.

Salmon Pack: Preliminary statistics released September 19 disclosed the British Columbia salmon pack as 1,762,705 cases of all species. Sockeye salmon account for a majority of the catch and represent 1,064,578 cases. Pinks accounted for 453,172 cases, chums 130,882 cases, and coho 92,746 cases.

Several weeks previous canners were seriously worried about the marketing of the bonanza harvest. Their exports to the United Kingdom, which usually take about 40 percent and 50 percent of the pack, was limited by quota restrictions. Australia, a traditional importer of Canadian salmon, was facing dollar shortages. Accordingly, the fishing industry was facing a serious marketing problem with the prospect of a 2- to 3- year carryover. Plans were being laid for an intensive domestic sales promotion campaign. Carryover from last year's pack was negligible, and the industry had to import Japanese salmon for the domestic market while continuing to export Canadian salmon in order to preserve their foreign markets.

Lifting of British currency restrictions, at the Commonwealth Trade Conference at Montreal, changed the picture for British Columbia salmon exporters overnight. Previously the British quota for the import of "dollar" salmon was pegged at $4.5 million. Within 24 hours the British Columbia fishing industry announced that 700,000 cases of sockeye had been bought up by British importers for a total of $26 million. Prices ranged from $37 to $40 a case and it was reported that one large British firm tried to buy the entire pack. Approximately 300,000 cases are being retained for the Canadian market. Previously British Columbia sockeye, a British favorite, had been a rarity in English stores. Orders were also placed for pink and coho salmon.

It is expected that the main competitor for British Columbia salmon in the British market will now be Japan. The British restriction remains on Russian salmon. American salmon will also benifit from the British action; however, American salmon will not have the advantage of the British Preferential Tariff.

It has been estimated that the landed value of the Canadian sockeye catch will approximate C$21 million with an additional $10 million in other species. Canadian canners are expected to realize C$38 million for the sockeye pack, another $12 million for other canned salmon species, and $11 million from fresh, smoked, and frozen salmon.

Agreement on Ex-vessel Prices: As a result of a union-industry agreement signed August 18 and retroactive to the first day of fishing, the following guaranteed minimum prices were agreed on for number one quality fish net-caught (round): sockeye 28¢ a lb., coho and steelhead 16¢ a lb., pinks 9-1/4¢ a lb., chums (up to Aug. 31) 7-1/2¢ a lb., jack springs 20¢ a fish.

Colombia

REGULATIONS AFFECTING SHRIMP INDUSTRY ANNOUNCED:

The Colombian Government by Resolution No. 0930, dated August 22, 1958, announced that all shrimp for export must be packed in 452-gram (5-lb.) paraffin-dipped boxes manufactured in Colombia. The same resolution also extended the time limit for the construction of shore-based fish-processing plants by Colombian fishing companies,

Colombia (Contd.):

according to a September 19, dispatch from the United States Embassy in Bogota.

Cuba

CLOSED SEASON FOR TURTLES, TORTOISES, SHRIMP, AND OYSTERS ENDED:

The Instituto Nacional de la Pesca (National Fisheries Institute), by Resolutions published in the Official Gazette of September 15, 16, and October 3, 1958, terminated the closed season originally imposed on June 15, 1958, on the capture of turtles and tortoises, effective September 10, 1958.

As of September 15, 1958, the Institute ended the closed season originally imposed on June 15, 1958, on the capture of shrimp and oysters.

On October 10, 1958, the Institute ended the closed season originally imposed on July 15, 1958, on the capture of moro crab, Cuban snapper (Cubera), and gray snapper (Caballerote).

Ecuador

IMPORT REGULATIONS AFFECTING FISH CANNING INDUSTRY RELAXED:

One of the major problems facing producers of fish products in Ecuador is the difficulty presented by Ecuadoran Government regulations covering the importation of essential raw materials. In particular, these regulations had proven burdensome to the operations of Ecuador's only tuna-canning company engaged in the export of canned tuna. This company, a United States owned enterprise, is located at the west central seaport of Manta. Company officials have complained bitterly in the past regarding difficulties they had experienced in obtaining official permission for the importation of such needed materials as tin plate, soybean oil, and spare parts and equipment for both fishing and packing. The necessity of complying with complicated regulations, in the company's opinion, severely restricted efforts to promote the development of both exports of canned tuna from Ecuador and an increase in domestic market sales.

Apparently as a result of repeated company approaches to secure an improvement in these conditions, the Ecuadoran Government in mid-September 1958 approved an official decree providing for substantial relaxation in regulations affecting imports by fish canning companies. According to Guayaquil news reports, article one of the new decree, which reportedly became effective on September 18, provides that fishing companies which have been duly authorized by the Government to operate in Ecuador, and which are engaged in the export of fish products which have been prepared and canned in Ecuador, shall no longer be required to obtain the advance permission of the Exchange Department of the Central Bank of Ecuador in order to import, with their own foreign exchange, equipment spare parts, accessories, and other materials needed for the development of their activities, and which were previously classified in the import lists annexed to existing foreign exchange regulations. News reports regarding this decree also stated that this relaxation in regulations had been approved by the Government in order to promote greater development of the national fishing industry.

Company officials are hopeful that with approval of this decree they will have no further difficulty in maintaining adequate stocks of both canning materials, spare parts, and accessories for plant operations, states an October 22, 1958, dispatch from the United States consulate at Guayaquil.

France

FORCED COLD-AIR DRAUGHT IN FISH HOLDS CUTS ICE COSTS:

Savings in the cost of ice used on a trawler of as much as 60 percent can be attained by the introduction of a forced draught of refrigerated air into the holds. In addition, the quality of the fish is much improved, according to claims made by a French company specializing in the installation of refrigerated holds in fishing vessels. They are based on the results actually obtained in trawlers fitted out by the company.

France (Contd.):

Methods in use, of course, keep the hold cool by the use of a "cold bank" situated generally at the top of the hold. But while this cools the air in its vicinity and to some extent the shelves nearby, the lower ones are relatively unaffected.

In the process used by the French company, cold air is forced through to every part of the hold, thereby keeping the fish at a constant temperature throughout its mass.

In fact tests taken by plunging a thermometer into the body of fish and recorded daily throughout the return trip from the fishing grounds show a curve descending gradually to 28° F. and rising slowly to 30° F. during the ten-day voyage.

It is not generally known that a temperature slightly subfreezing is the ideal for fish preservation, particularly in the case of fish caught in northern waters; for the fact is that the colder the waters in which fish live, the more resistant to refrigeration are the bacteria found on it. Subfreezing temperatures are impossible by the use of ice alone.

When a hold is refrigerated by the French company's process care is taken at the outset that the insulation is as perfect as possible. A thickness of cork of 8-10 inches or its equivalent in other material is the minimum that should be permitted. The hold is then divided into compartments both laterally and horizontally, but with openings at the top of each so that the cooled air can pass readily from one to the other.

In effect, a current of refrigerated air is introduced through trunking to the space between the outside of the hold and the walls of the compartments, being forced through by a powerful fan. This finds its way, indeed is forced through by the constant pressure behind it, by way of the vents situated at the top of each compartment and eventually to the opposite side of the hold whence it is led back to the refrigeration plant so that the cycle is continuous.

The evaporators which produce the cold air are situated in the space immediately behind the hold. They consist of a bank of gilled pipes made of brass and set into cubic form. This way the heat-exchange co-efficient is high and a rapid reduction in the temperature of the air passing over them is possible. The fan motors can be supplied either 24 volt d.c. or 110 volt a.c., single or 3-phase. It is essential because of the humid atmosphere in which they work that they are fully enclosed.

The whole of the plant, including the trunking and the double walls to the hold which form the passageways for the air current, are made and mounted in such fashion that they can be taken down with ease to permit the necessary cleaning between voyages.

The flow of refrigerated air does not dispense with the use of ice in the hold; but by keeping the air circulating round it at subfreezing temperature it reduces its melting point to an extent that an ice saving of 60 percent is possible. It is important, too, to note that the temperature recorded in the interior of the fish was always below freezing. When ice alone is used a difference of several degrees is often recorded.

The French company's process is protected by a British patent and arrangements are now being made for its exploitation in the United Kingdom. (The Fishing News, September 12, 1958.)

Greece

SPONGE FISHERY TRENDS:

Prices for this season's sponge catch are expected to be about 4-7 drachmas (about 13-23 U. S. cents) higher due to the better quality of the sponges from waters off Egypt and Cyrenaica.

The United States market for sponges is overstocked and few sales of this season's crop are expected in that market, according to the Greek fishery periodical Alieia. The western European sponge buyers are expected to delay purchasing in the hope of lower prices. However, the demand for second- and third-quality sponges by the eastern European market is better.

German Democratic Republic

EAST GERMAN FISHING FLEET CANNOT SUPPLY COUNTRY'S FISH NEEDS:

In spite of its large fishing fleet, the East German fishing industry can supply only about 25 percent of the country's fish needs, according to an article which appeared in the West German fishery periodical Allgemeine Fischwirtschaftszeitung. Technical deficiencies of the fleet and the long trips which East German fishing vessels must make to reach their catching grounds are primarily the reasons for the fleet's inability to supply the needed fish. East German fishing vessels, as a result, can utilize only 50 percent of their present productive capacity.

The Russians have not given any heed to requests made by the East German Government for permission to use Murmansk as a base of operations for their fishing activities. The author of the article says plans have been made in East Germany to build factory trawlers capable of staying out at sea for two months, but it may take until 1965 before such vessels will be placed into service.

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FISHERY TRENDS:

During the past five years, two State-owned fishery combines have been established in Sassnitz and Rostock in the Soviet Zone of Germany. The fishing fleet operated by these combines is relatively large: 200 deep-sea cutters, 35 luggers, and 24 trawlers. Besides the two combines, there exist numerous fishery cooperatives on the Baltic coast, op-

German Democratic Republic (Contd.):

erating about 200 small wooden cutters. However, these wooden cutters are suited only for coastal fishing operations. Under present catching conditions, the fishing fleet of the Soviet Zone has a total catching capacity of about 130,000 metric tons of fish per year. In 1957, actual landings, however, amounted to only about 65,000 tons of fish, which means that only 50 percent of the total catching capacity of the fleet was utilized. The reason for this was that about one-third of the fleet was laid up on account of technical breakdowns.

If the catching capacity of the East German fishing fleet could be utilized up to 100 percent, only half of the actual fish demand would be met in the Soviet Zone. The demand for sea fish in the Soviet Zone is estimated to amount to 260,000 tons. At present, the fishing fleet can only meet one-fourth of the demand. There is another reason why the fish landings of the relatively large fishing fleet are so small. East German fishing vessels have to make exceptionally long trips to reach their catching grounds, i. e., the North Sea, the waters off Iceland, the "Rosengarten" southeast of Iceland, the banks off the Norwegian coast, the waters off Bear Island, and the Barents Sea. The small vessels of the Soviet Zone fishing fleet can stay at sea for an average of three weeks only--14 days must be deducted from these three weeks for the round trip to the fishing grounds. This leaves only 8 days to catch fish. If the sea is rough, the small boats are often unable to catch fish. Therefore, they often return with small catches.

In order to improve the results of the catching trips, the crews of the fishing vessels have demanded larger vessels which are able to stay at sea for about two months. Already the First Five-Years' Plan, which expired in 1955, provided for the construction of such vessels. However, they have not been built yet. Under the Second Five-Years' Plan, such vessels are to be put into service until 1960, in order to improve the productivity of deep-sea fishing. It is planned to build the factory fishing vessels in Soviet Zone shipyards. The modern factory trawlers being built by shipyards in the German Federal Republic will serve as samples. The Second Five-Years' Plan provides for the construction of five such factory trawlers to be built until 1960. Since the time required for the construction of each of the vessels will be about two years, the new factory trawlers will not be completed before 1965.

The small vessels of the East German deep-sea fishing fleet might be able to nearly fill the fish demand of the population of the Soviet Zone, if the Soviets would permit East German vessels to use the port of Murmansk as a base for their fishing operations in the Barents Sea. At present, Soviet Zone luggers require 18-20 days for a round-trip from the Barents Sea to the ports of the State-owned fishery combines in Sassnitz and Rostock. A round trip from the same catching grounds to Murmansk requires only 3 to 4 days. Operating out of Murmansk, quite a number of other fishing grounds could also be reached in considerably less time than required now. The fish could be shipped in refrigerated trains from Murmansk to the Soviet Zone. Such transports would be 4 to 5 times faster than by vessel. In addition, each Soviet Zone lugger and trawler would be able to make twice or three times as many fishing trips, and increase its production by as much as 400 to 600 percent, if it were permitted to land fish in Murmansk during the Barents Sea fishing season.

For years East German authorities have been trying to improve the uncooperative working methods in the fishing trade of the "socialist camp" in favor of the Soviet Zone fishing fleet. All efforts to come to an agreement with the Soviet Union regarding the use of Murmansk have been without avail.

Haiti

JAPANESE FISHING CONTRACT APPROVED BY ASSEMBLY:

The Haitian Assembly on July 17, 1958, voted approval of a contract signed on April 30, 1958, between the Government

Haiti (Contd.):

and one of the largest Japanese fishing companies. The Japanese company will be permitted to operate deep-sea fishing fleets from Haitian ports and to have the exclusive rights to export from Haiti fish caught on the high seas by vessels based in Haiti, the United States Embassy in Port-au-Prince reported in a September 26 dispatch.

Information received prior to this dispatch indicated that the Japanese firm would start building a freezer in Port-au-Prince within four months after the contract had been signed and that the contract was for a term of 25 years. In addition, the firm plans to concentrate on the long-line fishery for tuna.

Israel

TUNA FISHING COMPANY WITH JAPANESE-SWISS PARTICIPATION ESTABLISHED:

Following negotiations which were initiated by Israel's Minister of Commerce and Industry during his visit in Japan several months ago, a joint Israeli-Japanese-Swiss fishing company has been officially founded which will engage mainly in tuna fishing in the South Atlantic and Indian oceans.

The new enterprise is reported to own the M/V Shimu Maru, which left Japan several weeks ago and is now engaged in deep-sea fishing off the coast of South-West Africa. The vessel is one of a series that will be purchased in Japan by the company together with a larger ship equipped with refrigeration facilities. The firm's initial capital is understood to amount to US$100,000, while a further sum of US$200,000 is to be invested at a later date. The foreign partners in the new venture are a Swiss firm and a Japanese firm, reportedly affiliated with one of the largest Japanese shipping companies.

A recent statement by a Japanese representative of the new firm now visiting Israel in the company of the Israeli manager indicated that the joint fishing enterprise will also be active shortly in the Red Sea where good prospects are said to exist for deep-sea fishing.

One of the fishing boats of the company will also serve as a floating plant for the production of fish meal from fish that are not used for human consumption. There are also plans to cultivate pearls in the waters of Eilat Bay, since its steady warm temperature throughout the year is believed to be very favorable for pearl culture. Japanese experts are at present in Eilat for the purpose of giving the necessary instructions to Israeli fishermen.

At the end of October, the Shimu Maru is due to arrive in Haifa and will take aboard a complement of Israeli fishermen who will be trained in deep-sea fishing methods. The first catch is expected to be marketed in Israel, the United States Embassy in Tel Aviv reported in a dispatch dated September 22, 1958.

Italy

REVIEW OF THE FISHERIES, 1957:

Italy's landings of fish and shellfish from the Mediterranean Sea amounted to 175,047 metric tons in 1957 as compared with 188,975 tons in 1956--a decrease of 7.4 percent.

Table 1 - Italy's Landings of Marine 1/ and Fresh-Water Fishery Products

Year	Fish	Molluscs	Crustaceans	Fresh-Water Fish
	(Metric Tons)			
1957	136,997	30,388	7,662	3,393
1954	150,835	27,491	6,670	3,618
1953	148,388	24,954	6,016	2,995
1952	165,465	22,783	5,443	2,997
1951	145,794	16,367	4,848	2,402

1/Mediterranean production only, and excluding sponge production.

Imports of fishery products for 1957 amounted to 127,567 tons. Dried salted cod from Norway and Canada were the main imported fishery products, about 36 percent of the total imports. Exports of fishery products average only about 1,240 tons annually.

Italian sponge production has decreased considerably since 1951. Coral produc-

Italy (Contd.):

tion has increased as compared with 1951, but decreased as compared with the production in the period 1952-1955.

Table 2 - Italy's Production of Sponges and Coral

Year	Sponge	Coral
	(Metric Tons)	
1957	10.4	1/
1956	9.2	4.0
1955	12.5	6.7
1954	28.0	7.2
1953	24.2	9.1
1952	26.2	8.2
1951	95.3	1.7

1/Data not available.

Italy's per capita consumption of fish in 1921 was 16.3 pounds, dropped to 14.6 pounds in 1941, and rose to 15.7 pounds in 1955.

The Italian fishing fleet in 1957 consisted of 43,948 fishing craft, of which 11,136 were fitted with motors. In 1955 about 145,457 persons were engaged in the fishing industry. (Information Bulletin, No. 14, August 1958, General Fisheries Council for the Mediterranean.)

Japan

EXPORT OF TUNA LOINS AND DISCS TO THE U. S. APPROVED:

Since mid-August 1958 the Japanese fisheries trade press has been following closely the cautious steps that have been taken by the Japanese tuna industry and Government agencies toward a reopening of exports to the United States of cooked tuna loins and discs. These semiprocessed products can be canned with less than half the labor required for processing whole fish, and it is easy for all types of United States packers and others to engage in tuna canning. These products were placed under an export embargo in October 1957 because of the protests of United States tuna canners.

Following a meeting on September 4 of representatives of the Japanese Ministry of Agriculture and Forestry, the Ministry of International Trade and Industry, and the Ministry of Foreign Affairs, at which the reopening of loin and disc exports was finally approved, the Export Tuna Freezers' Association held a special meeting on September 5 and adopted certain changes to its regulations to cover the loin and disc trade. As these new regulations were to take effect 20 days after promulgation, it was considered almost certain that export of loins and discs would begin not later than October 1, 1958.

The new rules provide: (1) Total loin and disc exports to the United States to March 31, 1959, will be 2,970 metric tons, of which 2,850 tons will be allocated on the basis of past production records, 90 tons will be allocated freely, and 30 tons will be held in reserve; (2) in calculating equivalence of loins and discs to round fish, the ratio will be 2 to 1; (3) minimum prices for sales to exporters will be set by the directors of the Association; (4) members of the Association must not produce loins and discs in any plant not approved by the Association.

In a press conference on September 8, the Director of the Japanese Fishery Agency stated that the loin-and-disc export quota of approximately 3,000 tons in the next 6 months did not necessarily mean that exports of 6,000 tons a year were envisaged. The situation, he said, would be re-examined next April, the United States Embassy in Tokyo reported on September 18.

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FISHING INDUSTRY FORESEES INTENSIFIED COMPETITION FROM RUSSIANS:

The Japanese fishing industry is concerned that the Soviet Union's sixth Five-Year Plan calls for an annual catch of 4.2 million metric tons (9.3 billion pounds) by 1960. In the Far East much of this production will have to come from fishing grounds now exploited by Japan. Soviet fishery men who have visited Japan recently have expressed a strong and inquisitive interest in Japanese fishing techniques, particularly for saury and tuna. Soviet "Fisheries Minister" A. A. Ishkov is reported to have expressed the intention of ordering between 15 and 20 tuna vessels of the 800- to 1,000-ton class, and of seeking the services of Japanese experts to train the Russians in tuna fishing. These vessels, according to Ishkov, would operate mainly in the Atlantic, but he mentioned the possibility that one or two of them might fish experimentally in the Pacific.

Late in September 1958 a Japanese fishing vessel reported sighting an 80-ton Soviet steel vessel fishing for saury 20 miles off Ochishi in eastern Hokkaido. The point of this report that has excited the most interest is that the Soviet fishing vessel was not using a stick-held dipnet, as Japanese saury fishermen do, but was apparently pumping the saury aboard with a fish pump. Several similar boats have been seen fishing off Shikotan Island in the Kuriles, which is believed to be their base.

Japanese press comment on this development has taken two tacks. One is that a large-scale Soviet advance into the saury fishery will necessitate reconsideration of Japan's regulations, particularly with regard to the time of opening of the season, in view of the possibility that the Russians might decimate the schools before Japanese vessels are allowed to begin fishing. A need for more intensive investigation of the resource and its ability to stand up under

Japan (Contd.):

added fishing pressure is also foreseen. If the Soviets should pursue the saury south, into the main grounds of the Japanese fishery, an extension of the Japanese-Soviet fisheries treaty to cover this species is seen as a possibility, and one commentator has observed that in this case the positions which the two countries occupy with respect to salmon might be reversed, with the U.S.S.R. asking the Japanese for an annual saury catch quota. Another commentator has pointed out that it ill becomes the Japanese fishing industry, which raises the battle-cry of "freedom of the high seas" whenever objections are made to its own operations, to pull a long face at the prospect of foreign competition on the fishing grounds. The saury, it is pointed out, are a high-seas resource and thus open to all nations.

Increased Soviet competition is also feared in the field of whaling. Russia's whaling fleet, according to reports, is being augmented by a mammoth whaling factoryship (46,000 gross tons), the Sovetskaya Ukraina, which is soon to be launched at the Nosenko shipyards near Odessa. This ship is 715 feet long, 108 feet in beam, and 1.5 times the tonnage of the Slava, the factoryship which the Russians are using in the Antarctic at present. As completion of outfitting is estimated to require 6 months, the new ship cannot take part in the 1958/59 winter's whaling, but it is considered certain that she will be going to the Antarctic next year. (United States Embassy dispatch from Tokyo, September 25, 1958.)

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NEW GOVERNMENT CORPORATION ESTABLISHED TO PROMOTE EXPORTS:

On April 26, 1958, the Japanese Diet passed the "Japan Export Trade Promotion Agency Law" which provided for the establishment of a new government corporation to succeed the Japan External Trade Recovery Organization and to take over the functions, responsibilities, and facilities of that organization. On July 8, the Diet approved additional legislation which provided a capital fund of ¥2 billion (about US$5.6 million) for the new organization. The new organization (Japan Export Trade Promotion Agency) was established as of July 25, 1958, with headquarters at Kokusai Kanko Kaikan Bldg., No. 1, Marunouchi 1-chome, Chiyoda-ku, Tokyo, Japan (the head office of the old Japan External Trade Recovery Organization had been at Osaka).

The Agency will have the same broad responsibilities for promotion of Japanese exports as did its predecessor organization. However, the predecessor organization operated as a quasi-government agency in the sense that a portion of its financial support was provided by Japanese Government appropriations. The remainder came from membership fees from about 300 members, comprising trading firms, manufacturing companies, and banks, and donations from prefectural and city governments. The new organization will operate as a wholly Japanese Government corporation. Its working capital will come from interest obtained from the capital fund, from yearly Japanese Government appropriations, from sales of publications, and services (for example, where some special service is provided a private firm such as exhibiting the firm's products at a trade fair), and possibly from donations. The new Agency is operating under a budget of approximately $4.7 million for fiscal year 1958 (April 1, 1958-March 31, 1959).

The Minister of International Trade and Industry has appointed a president, vice president, and a secretary-general and auditor for the new organization and to date has approved the appointment of four directors.

The law creating the new Agency, in addition to providing for officers and directors, provided that an operations council should be established to act as a consultative body for the president of the organization and to deliberate and decide upon important matters concerning the operation of the organization.

The new operational council met on August 18, 1958, and approved an operating program for the new Agency that includes establishment of new overseas trade centers, a strengthened market research program, and participation in international trade fairs.

Included in the program for the balance of fiscal year 1958 are (1) overseas market research; (2) overseas special promotional work; (3) participation in international trade fairs; (4) export promotion of Japanese agricultural and aquatic products (includes concentrated market research to be carried out in the United States on raw and canned tuna and vitamin oils); (5) modernization and improvement of design for Japanese export merchandise.

The working organization with headquarters in Tokyo will include these departments: (1) planning; (2) service; (3) finance; (4) trade center; (5) overseas public relations, overseas expositions, agricultural and aquatic products, machinery, and Brussels Exposition Administration. The working organization is set up to include overseas trade centers and joint offices with export associations. A joint office with the the frozen fish export association is located at Long Beach, Calif.

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SAURY FISHING SEASON OPENS:

The saury, or mackerel pike (Cololabis saira), fishing season in Japan opened legally for boats under 20 tons gross on August 12, 1958, for 20-30 ton boats on September 1, and for larger vessels on September 12. Fishing will continue into January of 1959.

This species, which is not fished commercially elsewhere in the Pacific, is one of Japan's most important food fishes, and last year's landings of 929.6 million pounds were second only to anchovies in the Japanese catch. It provides cheap fresh fish for the domestic market and raw material for low-priced canned goods for export to Southeast Asia, Africa, and the Near East. Last year's average ex-vessel price was 1.4 U.S. cents a pound. Saury is also important as bait for tuna long-lining.

Landings have been increasing steadily since the war, and annually run 6 to 7 times higher than the prewar record. In the 1957/58 season, 1,909 vessels participated in the fishery, 746 of them under 20 tons and 577 between 20 and 50 tons. This season the number of smaller boats is down slightly, but the number of large boats taking part in the fishery has increased. This reflects changes in the size composition of the fleets engaged in other fisheries, as saury fishing is an off-season occupation for draggers, seiners, salmon gill-netters, and small tuna boats. The saury is captured primarily with a stick-held lift net (bokeami), the fish being attracted over the net by light.

The schools of this small (12-18 inch) pelagic fish first appear east of Hokkaido and move southward off the Pacific coast of Honshu as the cold water spreads out during the winter. Some saury are landed as far south as Kyushu, but the bulk of the landings is concentrated in the areas north of Tokyo, particularly in Fukushima and Chiba prefectures. Early season scouting this year by 13 research vessels from Hokkaido and 6 from northeastern Honshu have produced forecasts, based on the hydrographic picture and the pattern of appearance of the schools, of another heavy catch. A committee of government and industry has been working, as it does each year, to prepare transportation and marketing facilities to handle the flood of saury and to prevent the disastrous price breaks which too often result from heavy landings of this species in ports far from the main population centers. Special trains carrying saury from northeast Honshu to Tokyo will begin running on September 15.

The Saury Export Canners Association, meanwhile, has been laying plans for its new production year, which began August 1. The initial plan, set up early in July, was for a total of 830,000 cases, of which production was to begin as soon as possible on 650,000 cases and the final decision on whether or not to pack the remainder was to be left until the end of August, after it was seen how sales were progressing. The canners were reportedly eager to produce, while the Canned Fish Joint Sales Co. wanted to hold back, in view of the anticipated carryover of 170,000 cases of last season's pack. The packers are said to have threatened that if they did not get an additional quota of at least 100,000 cases, they would be forced to produce saury in soy sauce for the Philippines trade, an export which had been embargoed for 1 year after August 1 because of the serious competition it was giving Japanese canned sardines in that market. On August 29 it was finally decided to authorize an additional quota of 150,000 cases, making a total of 800,000 cases for the year.

The Joint Sales Company, faced with a total of 930,000 cases to sell--the carryover from last year is now put at 130,000 cases--has set up the following sales goal: Egypt, 100,000 cases in water; Burma, 200,000 cases in tomato sauce; Singapore and Malaya, 120,000 cases in tomato sauce; Ceylon, 90,000 cases in tomato sauce; New Guinea, 10,000 cases in tomato sauce, 80,000 cases in water; West Africa, 35,000 cases in tomato sauce; Indonesia, 20,000 cases in tomato sauce; Philippines, 75,000 cases in tomato sauce, 175,000 cases in water; other markets, 16,000 cases in tomato

Japan (Contd.):

sauce, 9,000 cases in water; totals, 476,000 cases in tomato sauce and 454,000 in water.

Prices at the canners' level this year for canned saury in tomato sauce are: No. 1 cans, US$6.38; No. 3 cans, $7.20; small No. 1 cans, $5.68; and No. 7 fruit cans, $3.60 a case. Prices for canned saury in water are: small No. 1 cans, US$5.12; and No. 4 cans $5.05 a case. This represents a drop of 27 U. S. cents a case on tomato sauce No. 3's and No. 4's in water, and of 13 cents on No. 1's in water. The No. 7 fruit can, which is a new pack, is set at 19 cents below the price for sardines in the same size can. (September 15, 1958, dispatch from the United States Embassy at Tokyo.)

Mexico

ENSENADA FISHERY TRENDS, THIRD QUARTER 1958:

Shrimp Fishery: During July 1958, the catch of shrimp in Sebastian Vizcaino Bay and the Puerto de Santo Domingo on the west coast of Baja California by boats largely from Sonora and Sinaloa was at a high level. In the middle of the month 7-10 shrimp trips arrived daily in Ensenada, selling at a reported 20,000 pesos a ton (about 72.6 U.S. cents a pound). The Ensenada area prospered from the good catch; shrimp were frozen and canned at the canneries; the vessels purchased so much ice as to exhaust the supplies of the local ice plants; and crew members helped to bolster retail store sales. At the end of the month the shrimp moved south and with them left a flotilla of 100 shrimp boats.

Spiny Lobster: The spiny lobster season was due to open on October 15, 1958, and continue until March 1, 1959. With the usual optimism, experts say that the season in Baja California waters should easily surpass that of the year before.

Canning: The sardine catch continued to be poor in the third quarter of 1958, and except for seasonal work, canneries at Ensenada complained that their business was still in a slump, which has already lasted two years. It is hoped that the anticipated good spiny lobster catch will stimulate activity in these canneries.

New Fishing Company: A new company, 100-percent Mexican-owned, which will engage in the catching, processing, and sale of tuna, has been formed with a capital of about US$800,000. The firm will have six boats equipped with refrigeration. In addition, the company expects to maintain a well-equipped repair shop in Ensenada to service the vessels. These vessels will give business to the canneries of Ensenada, which, in addition to tuna, will can the lower-priced jack mackerel and striped tuna (skipjack).

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MERIDA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1958:

During July-September 1958 shrimp exports (almost all to the United States) from the Merida area on Mexico's east coast amounted to 4,752,000 pounds, down about 4.4 percent from the 4,970,000 pounds exported in the third quarter of 1957. The usual increase in the landings of shrimp for this quarter failed to materialize this year. As a result, both the Campeche and Ciudad del Carmen boat owners were having financial problems.

Prices received for 15-20 headless shrimp at Brownsville, Tex., during the quarter averaged about 90 U. S. cents in July, 96 cents in August, and 88 cents in September. Smaller sizes brought from 5-8 cents less per pound for each smaller size group.

At the end of the quarter the United States market was weaker for frozen shrimp, particularly for the large and jumbo sizes. But shrimp prices often decline seasonally during the fall when landings on the United States Gulf of Mexico coast increase.

In addition to shrimp, other fishery products exported during the third quarter in 1958 were frozen fish (24,400 pounds), shark fins (2,700 pounds), and shark skins (18,200 pounds).

Morocco

FISHING FLEET AS OF JANUARY 1958:

As of the end of 1957 the Moroccan fishing fleet totaled 2,270 vessels, of which 1,850 vessels or 81.5 percent were under 5 tons in size. The number of fishermen totaled 8,588. Of the 1,850 small trawlers and line vessels ("palangriers"), only 129 were equipped with motors. The trawlers vary between 30

Table 1 - Moroccan Fishing Fleet as of January 1958

Fishing Port	Trawlers ("chalutiers et chalutiers-sardiniers")		Commercial Sardine Seine Fleet 1/ ("sardiniers")		Small Trawlers and Liners 2/ ("palangriers")
	Number	Tons	Number	Tons	Number
Tanger	-	-	1	16	24
Kheuitra (Port Lyautey)	7	227	1	6	104
Rabat	3	123	3	37	67
Fedala	1	13	9	83	98
Casablanca	44	2,911	57	731	201
El Jadia (Mazagan)	-	-	7	98	150
Safi	32	1,126	94	2,347	345
Essaouira (Mogador)	1	23	12	256	196
Agadir	30	1,189	118	1,859	785
Total	118	5,712	302	5,405	1,850

1/16-ton average.
2/3.4-ton average.

and 70 tons. The seiners, employing purse-seines ("cerco"), average 18 tons.

Nylon purse-seine nets are now widely used by the commercial sardine fleet and a large nylon tuna purse-seine was recently bought from Japan for experimental purposes. Experiments are also being made with electric fishing.

There are five tuna trap nets ("madragues") operating on the Moroccan coast, and a sixth is to be installed dur-

Morocco (Contd.):

ing the course of this year, the United States Embassy at Casablanca states in a dispatch dated September 23, 1958.

Norway

COD FISHING ON THE NEWFOUNDLAND GRAND BANK:

The Grand Bank of Newfoundland is now the scene of a greater international fishery than at any time in history. Bolstering the traditional fleets from Spain, France, Portugal, the United Kingdom, Italy, the United States, and Canada are fishing vessels from the U. S. S. R., Norway, and the Faroe Islands. Some of the latter countries have appeared on the scene only in the past year or two, for example the U. S. S. R., Norway, and the Faroese.

Three Norwegian long-liners arrived in the port of St. John's, Newfoundland, in June 1958. The biggest vessel was 348 gross tons and carried a crew of 22 men; the other vessels were approximately 220 tons and had a complement of 20 men. They left Norway April 9 and returned with their first load by the first week in July. After a two weeks' stay in Norway, they set out for the western banks again and returned with a second load of cod in October. The work of the crews is limited to catching, splitting, and salting the fish. Most of the catch is cured in artificial dryers by the company which buys their catch.

The catching method employed by the Norwegian fishermen is to use two lines to a tub. Each line is 75 fathoms in length and has 100 hooks attached. Thirty lines are joined together, which gives a total length of 2,250 fathoms (13,500 feet). They usually work two strings at a time, and sometimes three.

The lines are set at night while the crew rests. A good week's catch would be 80,000 pounds of salt fish. The price paid for top-quality salt cod is 12½ cents a pound and these fish must measure at least two feet.

The average Norwegian fisherman earns about 12,000 kroner (US$1,780). Out of this he pays 1,000 to 1,200 kroner (US$140-170) for his food.

Under the Norwegian method of processing, the fish are bled for two hours as soon as they are caught. Then they are split, salted, and stacked. After a period of about seven days the old salt is removed and the fish receive a light sprinkling of clean salt and are restacked. (Canadian Department of Fisheries Trade News, July 1958.)

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FISHERIES TRENDS, JANUARY-AUGUST 1958:

During the first eight months of 1958 landings by Norwegian fishermen totaled 927,579 metric tons as compared with 1,326,321 tons in the first eight months of 1957. As a rule about 85 percent of the annual catch is landed during the first eight months of the year; therefore, 1958 promises to be a relatively poor year for the fishing industry as a whole.

In a closely divided vote, the National Council of the Norwegian Fishermen's Association decided to urge the Government to proclaim a 12-mile fishing limit effective January 1, 1959, unless the fishing limits dispute between Iceland, the Faroes, and the British is settled satisfactorily before this date. The Government favors settlement of the dispute over fishing limits by means of an early international conference under the auspices of the United Nations. The Government, however, has observed the newly established Icelandic 12-mile limit by cautioning Norwegian vessels about fishing inside this limit.

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GOOD SHRIMP RESOURCES FOUND OFF WESTERN SPITZBERGEN;

The research vessel of the Tromsø Museum in northern Norway returned recently from a trip to Western Spitzbergen with a report that it had trawled for shrimp and found very good resources in the Isfjorden and Forlandet areas. The largest catch was 200 liters in a one-hour drag or about 5.7 U. S. bushels. The en-

Norway (Contd.)

tire catch was large fine shrimp, according to a September 17, 1958, report in Fiskaren, a Norwegian fishery trade paper.

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SEALING OPERATIONS IN DENMARK STRAIT TO BE ENDED GRADUALLY:

The Norwegian Minister of Fisheries stated to the press in September 1958 that the Ministry has worked out a plan to bring about a gradual cessation of Norwegian sealing operations in the Denmark Strait, the channel between Southeast Greenland and Iceland. Under the plan no new concessions will be granted for sealing as old vessels are withdrawn from the operation. The gradual cessation of sealing in the Denmark Strait is being carried out in accordance with an agreement between Norway and the Soviet Union which the Storting ratified several months ago. No time limit for the cessation was stipulated in the agreement, but out of consideration for Norwegian sealing interests, the Soviet Union has agreed to let it take place by means of successive reductions over a period of time, the United States Embassy in Oslo reported on September 26, 1958.

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WHALING FLEET DEPARTS FOR ANTARCTIC:

Of the nine Norwegian whaling expeditions which will take part in the 1958/59 whale hunt, four left Norway during October for the 10,000-mile voyage to the Antarctic. The others will depart before November 10. Most of the ships are registered at Sandefjord, Tønsberg, and Larvik, in the province of Vestfold, where nearly 7,000 whalers have their homes.

Altogether 20 expeditions from 5 countries will participate in the coming whale hunt, same as last year. The total includes 9 Norwegian, 6 Japanese, 3 British, 1 Dutch, and 1 Russian. The number of catcher boats assisting the big factory-ships is also the same as last season--257, including those working out of the three land stations. Norwegian expeditions will have 92 catcher vessels, as against 94 last season. Another 7 will be operated by the Norwegian land station at Husvik Harbor, on the Island of South Georgia, which was closed last year, giving Norway a total of 99 catcher vessels. Altogether 6,830 Norwegian whalers will be in the Antarctic during the coming season, including 2,110 hired by British and Japanese companies. Crews aboard Norwegian whaling ships total 4,720, an increase of 356 over last year's figure.

At the last meeting of the International Whaling Commission it was decided to limit the total catch quota for all nations to 14,500 blue-whale units, each corresponding to about 137 drums of oil. This is the same quota that applied to the two preceding whaling seasons. The Netherlands, however, has protested that the quota could safely be raised to 15,000 units. So far, no action has been taken on the Dutch proposal.

The Antarctic open season for fin whales begins January 7, 1959, while the blue-whale season will start on February 1. Last winter, the blue-whale quota was filled in only 44 days, and the fin-whale season was closed after 69 days. Norway's share of the baleen whale catch in 1958 dropped to 39.6 percent of the total, as against 45.5 percent in 1957. Norwegian expeditions processed some 125,000 metric tons of whale oil, over 29,000 less than in the preceding season, and 19,800 tons of sperm oil, an increase of 3,400 tons.

According to a dispatch to an Oslo newspaper, Norwegian whaling operators take a dim view of prospects for the coming season. Among the adverse factors are a drop in the price of whale oil on the world market and higher wage scales granted to Norwegian crews. On the basis of the latest price for whale oil, £67-10.0 (about US$189) a long ton, the average Norwegian expedition will have to process over 15,500 tons to cover operating expenses, estimated to total about Kr. 21 million (US$2,940,000). The result is determined by weather and wind, the skill of the crew and, not least, plain luck. Norwegian whaling companies have an additional handicap in relation to several of their competitors. They are operated as commercial enterprises and receive no

Norway (Contd.):

state subsidies or special privileges of any kind.

Norway has repeatedly taken the initiative to place whaling on a more rational and economic basis. Though there is no international agreement to reduce participation, the Norwegian government has since 1948 rejected all applications for building new factoryships or replacing old ones. Since 1952, the number of Norwegian expeditions has been reduced from 10 to 9, whereas other nations have increased their participation. On the initiative of Norwegian whaling companies, a voluntary reduction has been assured in the number of catcher boats attached to each factoryship. The Soviet Union, which is not a party to the international agreement, used 24 catcher boats for the one Soviet expedition which took part in the 1957/58 season, as against an average of 10.4 for each Norwegian expedition. And in the next three years, three additional Soviet expeditions are scheduled to join the Antarctic whale hunt. This prospect is a source of grave concern in Norwegian whaling circles (News of Norway, Oct. 23, 1958).

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WHALING INDUSTRY FEARS INCREASED SOVIET PARTICIPATION IN ANTARCTIC:

The Norwegian whaling industry is reported by the press to be very concerned over the prospects of increased participation by the Soviet Union in whaling operations over the next few years. The Norwegian Whaling Council held a meeting in Oslo recently to consider what action should be taken to meet the threat of added competition. According to the press, consideration was given to the advisability of Norwegian withdrawal from the International Whaling Convention, states an October 3, 1958, dispatch from the United States Embassy at Oslo.

Peru

FISH MEAL PRODUCTION DOUBLED IN 1957:

The 1957 production of fish meal in Peru amounted to 64,480 metric tons as compared with 30,969 tons in 1956. Although there is Government control over the construction of new reduction plants, expansion of the fish meal industry continues at a rapid rate. Prices for fish meal in September 1958, according to a September 30 dispatch from the United States Embassy in Lima, were about US$145 a metric ton f.o.b. Callao.

There is some official concern over the increasing drain on anchovy resources as a source of fish meal. It is feared that the guano industry will be damaged as the large flocks of seabirds ("aves guaneras") are dependent on the anchovy as a source of food.

Philippines

RESTRICTIONS ON OTTER-TRAWL FISHING PROPOSED:

The Philippine Undersecretary of Agriculture and Natural Resources stated in October 1958 that the Department of Agriculture will issue an order restricting otter-trawl fishing in Manila Bay to certain areas to conserve the fish supply. This policy resulted from the charges of the small fishermen that trawl fishing was depriving them of their livelihood.

The proposed ban on trawl fishing is a recurrent problem which results from political pressure from small fishermen. The FAO fisheries consultant who recently completed a two-year study of commercial fishing in Manila Bay and San Miguel Bay, publicly stated that his studies had shown that trawl fishing, as practiced in the Philippines, did not deplete the supply of fish. Commercial fishing spokesmen claim that a shortage of fish would result if trawl fishing were banned. Officials state that one of the primary causes of fish depletion is the use of dynamite, which is primarily used by small fishermen.

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Portugal

CANNED FISH EXPORTS, JANUARY-JULY 1958:

Portugal's exports of canned fish during January-July 1958 amounted to 32,868 metric tons (2,012,800 cases), valued at US$17.7 million, as compared with 23,971 tons, valued at US$15.0 million, for the same period in 1957. Sardines in olive oil exported during the first seven months of 1958 amounted to 22,543 tons, valued at US$12.1 million.

During January-July 1958, the leading canned fish buyer was Italy with 5,579 tons (valued at US$2.9 million), followed by Germany with 5,225 tons (valued at US$2.8 million), Great Britain with 3,496 tons (valued at US$1.8 million), the United States with 3,085 tons (valued at US$2.2 million), and Belgium-Luxembourg with 2,435 tons (valued at US$1.2 million). Exports to the United States included 1,542 tons of anchovies. (Conservas de Peixe, September 1958.)

Portuguese Canned Fish Exports, January-July 1958

Species	January-July 1958	
	Metric Tons	US$ 1,000
Sardines in olive oil	22,543	12,062
Sardinelike fish in olive oil	3,589	2,464
Sardine & sardinelike fish in brine	624	143
Tuna & tunalike fish in olive oil	1,019	815
Tuna & tunalike fish in brine	438	218
Mackerel in olive oil	3,919	1,744
Other fish	736	215
Total	32,868	17,661

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CANNED FISH PACK, JANUARY-MAY 1958:

The total pack of canned fish for January-May 1958 amounted to 8,797 metric tons as compared with 9,204 tons for the same period in 1957. Canned sardines in oil (5,066 tons) accounted for 57.6 percent of the January-May 1958 total pack, higher by 15.4 percent than the pack of 4,389 tons for the same period of 1957, the September Conservas de Peixe reports.

Portuguese Canned Fish Pack, January-May 1958

Product	Net Weight	Canners' Value
	Metric Tons	US$ 1,000
In Olive Oil:		
Sardines	5,066	2,739
Sardinelike fish	371	176
Anchovy fillets	1,542	1,334
Tuna	810	604
Other species (incl. shellfish)	206	145
In Brine:		
Sardinelike fish	498	85
Other species	304	115
Total	8,797	5,198

Note: Values converted at rate of 28.75 escudos equal US$1.

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COD FISHING TRENDS, OCTOBER 1958:

The Portuguese cod fishing fleet operating on the Grand Banks and off Greenland was ordered to return to Portugal about the middle of October. The season's catch was estimated to be about 26,000 metric tons, or only about two-thirds of the fleet's capacity. A scarcity of cod and poor fishing weather contributed to the lower catch this season.

During the season six vessels were lost at sea (all crew members were saved) during the fishing season on the Grand Banks and off Greenland. About 1,500 tons of green salted cod were lost with five of the vessels (all of them more than ten years old). The loss of these vessels reduces the capacity of the Portuguese salt cod-fishing fleet to about 38,600 tons.

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FISHERIES TRENDS, JULY 1958:

Sardine Fishing: During July 1958, the Portuguese fishing fleet landed 8,706 metric tons of sardines (valued at US$1,096,939 ex-vessel or $126 a ton). In July 1957, a total of 7,556 tons of sardines were landed (valued at US$1,184,382).

Canneries purchased 53.4 percent or 4,652 tons of the sardines (valued at US$625,148 ex-vessel or $134.38 a ton) during July. Only 2 tons were salted, and the balance of 4,052 tons was purchased for the fresh fish market.

Matosinhos lead all other ports in July landings of sardines with 5,914 tons or 67.9 percent, followed by Portimao 937 tons (10.8 percent), and Penichi 611 tons (7.0 percent).

Other Fishing: The July 1958 landings of fish other than sardines were principally 4,650 tons (value US$331,050) of chinchards, 2,208 tons (value US$238,306) of anchovies, 320 tons of mackerel (value US$34,900), 93 tons of tuna (value US$22,400), and 44 tons of bonito (value US$6,800). (Consevas de Peixe, September 1958.)

Republic of Korea

ACCOMPLISHMENTS OF UNKRA IN FISHING INDUSTRY:

A report on the accomplishments of the United Nations Korean Reconstruction Agency (UNKRA) program of aid to the Republic of Korea states that "The fishing industry was supplied with large quantities of nets, other gear, and ice plant and cold-storage equipment. UNKRA boatbuilding materials resulted in 486 new fish-

Republic of Korea (Contd.):

ing craft and repairs to more than 1,200 others. Ten deep-sea fishing trawlers also were built in Hong Kong for Korea. Two modern new fish canneries were established with a total capacity of 300,000 cases a year, increasing canning facilities by more than 50 percent." (United Nations press release dated October 13, 1958.)

UNKRA was established in 1950 "to help the Republic of Korea and its people toward the restoration of their war-wrecked economy. The latest report (Doc. A/3907) marks the conclusion of the Agency's operational activities, except for a very few projects which will be carried to completion by a small staff of UNKRA personnel.

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TUNA LONG-LINE VESSELS FISHING FOR AMERICAN SAMOA CANNERY:

Vessels of South Korea's long-line sea-fishing fleet are scheduled to fish tuna for the tuna cannery located on American Samoa, which is leased and operated on that Island by a United States west coast canner. One Korean vessel has been fishing for the American Samoa cannery since the spring of 1958. In the meantime, another vessel was reported sailing for fishing off that Island and another six long-line fishing research vessels are scheduled to fish for tuna in the same area. (Ou Min Sinbo, a Korean newspaper, dated September 9, 1958.)

Spain

OFFSHORE FISHING FLEET OPERATORS OPPOSE EXTENSION OF TERRITORIAL WATERS:

The Syndical Council of the Spanish Syndical Federation of Operators of Long Range Fishing Vessels (Federacion Espanola Sindical de Armadores de Buques de Altura) at a meeting in Vigo on September 11-12 went on record as opposing any extension of existing territorial fishing limits.

The nongovernment organization also voted to send a telegram expressing the admiration of Spanish trawlermen to the English Federation of Fishing Vessel Operators in Grimsby, for the firmness and tenacity with which it is defending recognized fishing rights against the unilateral decision of the Icelandic government.

Turkey

FISHING INDUSTRY EXPANDS:

Four-fifths of the total fish production in Turkey consists of salt-water fish (90 percent are caught in the Black and

Table 1 - Turkey's Production of Fishery Products, 1952-57

Year	Salt-Water Fish	Fresh-Water Fish	Total 1/
	(Metric Tons)		
1957	90,470	18,500	108,970
1956	114,600	16,900	131,500
1955	83,000	20,000	103,000
1954	87,373	22,982	110,355
1953	67,031	25,369	92,400
1952	68,152	23,052	91,204

1/ Dolphin production is not included.

Marmara Seas), and one-fifth fresh-water fish. Of the total fish production, 75 percent is consumed on the local market

Table 2 - Turkey's Fishing Fleet, 1954-57

	1957	1956	1955	1954
Powered craft	1,230	995	975	950
Nonpowered craft	4,700	4,500	4,300	3,900

(70 percent as fresh fish, 30 percent as frozen, dried, smoked, or canned); 10 percent is reduced into meal or oil; and 15 percent is exported.

Table 3 - Turkey's Exports of Fishery Products and Byproducts, 1950-57

Year	Metric Tons
1957	19,660
1956	24,248
1955	15,846
1954	6,507
1953	4,787
1952	5,091
1951	4,260
1950	5,482

Turkey (Contd.):

About 25,000 persons are employed in the Turkish fishing industries, including canneries, reduction plants, etc.

The export of fish--including fresh and frozen fish, smoked and canned fish, fish meal and fish oil, and sponges, etc.--has increased considerably.

The annual per capita consumption of fish--including processed fishery products--has increased to 3.5 kg. (7.7 lbs.) in 1957 as compared with 2.5 kg. (5.5 lbs.) in 1952. (FAO General Fisheries Council for the Mediterranean, Information Bulletin, No. 14, Aug. 1958.)

U.S.S.R.

RUSSIAN METHODS FOR FREEZING FISH-AT-SEA:

The development of efficient fish-freezing-at-sea methods, and the construction of appropriate installations to effect this, are two of the most important problems facing the fishing industry, the British fishery periodical, The Fishing News of Sept. 26, 1958, reports in a summary of a paper presented by Soviet fisheries experts at a meeting held in Moscow.

These problems have been studied in Russia since 1888 when barges were constructed for frozen fish, and today about 300 large refrigerated fishing vessels are operated in the U.S.S.R. These vessels include refrigerated floating factories, non-powered floating refrigerators and fish-freezing barges, fishing freezer vessels of the Druzhba class, and large freezer trawlers.

Freezing in brine is used on some of these, with air-blast installations on others, including the freezer trawlers of the Pushkin class.

In the former case, sometimes the fish are dipped in cold brine, and sometimes it is sprayed over the fish. Various types of conveyors are used, some having automatically unloading baskets, others a wire-mesh conveyor belt carrying fish through the brine spray.

Most of the vessels (as distinct from the floating factories) are, however, equipped with tunnel freezers of the parallel air-blast type. The air coolers are located in the bottom of the tunnel on the factoryships, and beside it on the trawlers. The upper part of the tunnel has an overhead rail with a chain conveyor transporting the baskets of fish, which are in the tunnel from 4-5 hours according to size.

Aboard the trawlers, after unloading on to the upper deck, the fish is delivered through a bunker on to a table where six men are working. Each guts seven fish per minute by hand, so that about 60-65 tons of fish are dressed on the table each 24 hours. The gutted fish are placed on one of two conveyors, one leading to the fillet production line, the other for freezing drawn cod in blocks.

Machines are used on the filleting line for heading, filleting, and skinning, the filleting machine having an output of 20 fish per minute. Production of unskinned fillets is 42 percent of the whole fish, of the skinned 37.7 percent. The fillets are washed in brine, packed into pans, the pans loaded into trucks and run into the freezing tunnel. Eventually the fillets are taken from the pans and glazed with a water spray. The blocks are then cartoned, weighed and marked, and stacked in the hold.

There are four blast tunnels, each taking four trucks containing about 1,100 pounds of fish each.

Cod less than about 20 inches long are frozen in the round in blocks. After gutting and heading, the fish are washed in a special machine and placed in pans holding about 20 pounds, after which the freezing follows the same process as above described. The output in this section is about 35 fish per minute or 50 tons in 24 hours.

Comparative figures which have been produced show that the most perfect freezing installations are those operating on the large refrigerating freezer trawlers and some of the floating factories.

Even these, however, have certain faults which have yet to be eliminated: for instance the uneven distribution of the air current in the tunnel causing a variation in the freezing of the fish; and the mechanization of the installations still leaves much to be desired. Although baskets in the tunnel freezer in some of the floating factories are moved by means of a chain conveyor, as they leave the tunnel they must be transported manually. The heavy and bulky pneumatic machine used in moving the baskets containing the fish on the freezer-trawlers also needs simplification.

In all cases the use of removable pans to hold fish is considered a drawback. They are subject to damage, and floor space is taken up in their cleaning, repair and storage. In this connection a new method was evolved last year by the U.S.S.R. Scientific Research Institute for Refrigeration, whereby these faults were eliminated. In some cases defrosting the coils and the draining of the melted ice caused some trouble which needs investigation.

Those installations, including the trawlers, where the pans are provided with covers, give better results than where the pans are open. The covers reduce shrinkage (0.32 to 1.41 percent, reduced to 0.15 when covers are used), heat exchange conditions are improved, the upper surface of the block flattened, and its volume thereby reduced.

Because of drawbacks found in the process no more freezing-in-brine installations are being used in the U.S.S.R. except for tuna fishing. It has been found that the surface of the fish is salted, there is a great difficulty in maintaining the necessary temperature, and the working conditions for the personnel are unsatisfactory as they are in constant contact with cold brine.

However, the process has certain advantages, so research is continuing on the lines of finding an osmotically passive solution with a sufficiently low freezing temperature, so that the method could be used satisfactorily on some vessels.

Research on a large scale is also proceeding in the Soviet Union on methods of freezing by heat transfer by direct contact of the fish with the cooling surfaces--intermediate media, air and brine all being eliminated. Some experiments along these lines include a compression of the blocks which greatly increases the hold capacity. An experimental rotary quick freezer of this type has movable hollow wall moulds from which the frozen fish block can be removed without defrosting and the block is discharged automatically from the freezer. This work appears to be most promising.

United Kingdom

CANNED SALMON IMPORTS INCREASE SHARPLY WITH LIFTING OF RESTRICTIONS:

Japanese salmon canners are to expand exports to the United Kingdom to 836,000 cases by the end of the year, an increase of 300,000 cases as compared with last year's figure, according to a September 29 report from Tokyo.

The decision was made in an attempt to meet possible increased demands from Britain following the recent easing of import restrictions.

United Kingdom (Contd.):

First arrivals of canned salmon since the lifting of British restrictions on dollar imports are expected towards the end of November.

It is expected that the price to the consumer for some grades of salmon will be about 4s. 6d. a pound can (about 63 U. S. cents, and maybe much lower in the larger cut-price shops.

The free import of Canadian salmon is welcomed by the wholesalers who feel that the end of the artificial market for canned salmon is in sight. In the past some firms, including caterers, have been willing to pay exorbitant prices, but the bottom has now been knocked out of this market. The resale market has already felt the impact and at the time of writing the price per case of 48 half-pound cans had dropped by £2 (US$5.60).

Canned salmon sold heavily in the industrial areas before the last war, which soon made it a "luxury" food. Liverpool handles most of the imports and it seems likely that the bulk of the trade will revert to the well-known pre-war brand names. (London Financial Times, September 30, 1958.)

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EXPERIMENTS ON TEMPERATURE OF FISH IN TRANSIT:

Tests to determine the temperature of fish while in transit from the point of landing to the inland point of destination were conducted in June 1958 by the Humber Laboratory, Hull, British Department of Scientific and Industrial Research. These tests were part of a series of studies on the temperature of fish at all stages of the distribution chain begun in 1956.

Two observers were stationed at Aberdeen, two at Lowestoft, and two at an inland depot at Wokingham. Those at the ports measured the temperature of the fish as it was packed into boxes and marked such boxes with a special label. These boxes then traveled with all the rest of the consignment by insulated trucks to the inland depot.

Here the other observers watched for them during unloading and measured the fish temperatures again. Finally, some of the boxes which had traveled from Aberdeen to Wokingham were sent on to Lowestoft to simulate the journey from the inland depot to the retailer, and the fish temperatures measured for a third time.

While all this was going on, other members of the Humber Laboratory staff remaining in Hull measured the temperatures of herring arriving there from Scotland in boxes on open trucks covered by tarpaulins.

This work was not simply a comparison between insulated and uninsulated trucks. That was only one of the differences. An important point which was noticed right at the beginning of the experiment was that the fish in insulated trucks was always very well iced. That is to say, not only was there plenty of ice in each box, but it had been put in the right places, namely, both at the top and the bottom, as recommended.

Fillets, which at the time of packing in Aberdeen were at temperatures of 41° to 45° F., arrived at Wokingham at between 32° F. and 32.5° F. These are the average temperatures for the "best" and "worst" days, readings being taken for four days in succession.

Even when some of these boxes had been transferred from one truck to another and made the further journey to Lowestoft, their temperatures were between 33° F. and 35° F. Similarly, cod fillets, which left Lowestoft at 44° F. 46° F., arrived at Wokingham at 32° F.-33° F. In all cases the temperature of a box was obtained by taking the average of 12 temperatures measured in the fish.

Herring are slightly more difficult to cool than white fish, and although the average temperature of herring at Aberdeen varied between 37° F. and 42° F., i.e., lower than that of fillets, the average temperature of herring at Wokingham was a little higher--32° F. to 34° F. The difference, however, is very small. In all cases, for both herring and white fish, there was ice left in the boxes on arrival.

Many readings for other types of fish were also obtained and these results were all very close to those already given. In all, some 5,000 temperature measurements were made.

First of all there is no doubt that the fish had a good start on their journey. Herring, at a temperature of 37° F.-42° F., suggest icing at sea as well as icing and quick handling on the market. More recent observations at another port have shown that it is quite possible for a drifter to land herring with an average temperature of 50° F.

The temperature of the fillets at the start of their journey was also somewhat below the usual of about 50° F. A freshly-cut fillet tends to be at a temperature very close to that of the water used in filleting, and it is not easy in practice to keep this much below 50° F. even with the use of ice.

Thus with the present methods of the trade a temperature of 40° F.-50° F. in this stage of distribution is considered inevitable. The important thing is to get the temperature of the fillets down to 32° F. again as quickly as possible.

The most notable feature was the temperature at the end of the journey. These were very close indeed to the ideal figure of 32° F. In fact, some of them were slightly below this, for although pure ice melts at 32° F., a mixture of fish and ice can reach a slightly lower temperature (without freezing) because of the small amount of salt in the fish. Thus, although 32° F. is the ideal to aim at for wet fish, it is possible to do perhaps 1° F. better.

These results in this specialized distribution system may be compared with those obtained for herring arriving in Hull on open trucks under tarpaulins. When the latter were removed and the boxes unloaded it was found that 4 boxes out of 5 had no ice in them at all, and that the fifth only had one or two pieces.

As would be expected, the temperatures of the fish varied a great deal and although there were a couple of readings of 33° F. there were also several of 53° F. The over-all average of 900 readings on 32 boxes was 46.5° F. and only 5 percent of the fish were below 40° F.

Now the reason for these high temperatures is not necessarily the absence of insulation, although this will certainly be a contributory factor. More important still is the use of enough ice in the right place. The purpose of using ice is firstly to cool fish down, and secondly to stop it warming up again.

The amount of ice needed to cool the fish depends simply on the weight of fish and its temperature and has nothing to do with insulation. The rate at which the fish cools down depends on the way the ice is distributed. Where insulation matters is that it affects the amount of ice needed to keep the fish cool on the journey.

Within limits the more insulation the less ice. The man who uses open trucks would get as good a result as the man with insulated ones, but he would need to use more ice to do it. But as far as DSIR experience goes, the reverse seems usually to be the case.

United Kingdom (Contd.):

The same sort of argument applies if one is considering what thickness of insulation should be used. For any particular journey it should be possible to strike a balance between the cost of insulation and the cost of ice, bearing in mind that we have to consider not only the cost of these materials themselves but their effect on the payload of the truck.

However, as far as wet fish is concerned, there is a certain minimum amount of ice that we must have anyway, and if this ice is not distributed in the right places, no amount of insulation will give good results.

Of course, temperature is not the only thing that affects the quality of fish, and even the best distribution system cannot make fish any better than it was when it was landed. What it can do is to minimize the deterioration that inevitably occurs between the wharf and the retailer. In this respect there is much too big a difference between the best and the average. From Fish Trades Gazette (August 30, 1958), a British fishery periodical.

Note: Also see Commercial Fisheries Review, July 1958, p. 67.

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SMALL FISH MEAL PLANT DEVELOPED:

An engineering firm of Hull, England, has developed an interesting range of small fish meal plants, which are sufficiently compact to be installed aboard ship or in other confined spaces and are also claimed to be entirely self-contained.

The plants are designed for the production of meal and oil from fish and fish offal, shellfish, abattoir, and industrial waste products. It is particularly designed for service in isolated areas and has its own power unit, a 60 hp. gas turbine whose exhaust gases provide heat for cooking and drying.

The standard unit in the range is claimed to be suitable for all types of gutted or ungutted fish and has a nominal fish or fish waste capacity of up to 2,000 pounds an hour and 1,500 pounds an hour for shellfish or shellfish waste. A smaller plant has a capacity of 1,000 pounds an hour for fish or fish waste.

The working of the plant is described as follows: "The raw fish or waste is fed to the scraper elevator which discharges to the hogger, a machine specially designed for the reduction of fish, offal, and similar materials. From the hogger, the reduced material falls into a twin screw metering bin which feeds the cooker with a steady, continuous flow of raw material at a predetermined rate.

"The cooker is a horizontal tubular vessel fitted with a jacket through which a proportion of the hot gases from the gas turbine are circulated. A special form of screw conveys the material through the cooker.

"The cooked fish or offal is then lightly pressed in the new design, screw conveyor-press, which removes a proportion of the free liquors. The press discharges through a magnetic separator to a combined dryer and grinder where the turbine exhaust gases are introduced to provide latent heat. The time in the dryer-grinder is about three seconds.

"The dried meal is drawn through a cyclone separator and cooled in a further cyclone system which incorporates an adjustable cooling air intake and rotary valve discharge."

The standard fish-meal unit has a gross weight of just over 30,000 pounds and measures 21 feet long, 7 feet wide, and 10 feet high. (The South African Shipping News and Fishing Industry Review, August 1958.)

* * * * *

SUMMARY OF WHITE FISH AUTHORITY LOANS TO FISHING INDUSTRY, APRIL 1, 1957 TO MARCH 31, 1958:

The loans outstanding under the British White Fish Authority program of financial assistance to the fishing industry

Type of Loan	Loans Outstanding March 31, 1957	Loans April 1, 1957-March 31, 1958	Repayments April 1, 1957-March 31, 1958	Loans Outstanding March 31, 1958
	(US$1,000)			
Fishing vessels	13,598	8,686	1,837	20,447
Engines	239	199	104	334
Improvements to vessels	251	287	51	487
Nets and gear	3	1	1	3
Processing plants	333	887	49	1,171
Cooperative organizations	16	5	1	20
Totals	14,440	10,065	2,043	22,462

United Kingdom (Contd.):

increased about 55.6 percent from April 1, 1957, to March 31, 1958. During the 1957/58 year about 86.3 percent of total loaned (US$10,665,000) to the fishing industry was used for the construction of new fishing vessels. (British White Fish Authority, Annual Report and Accounts, for the Year Ending March 31, 1958.)

Uruguay

FISH MEAL PLANT DONATED BY UNITED NATIONS:

The Uruguayan Oceanographic and Fisheries Service (Servicio Oceanografico y de Pesca), a government entity which holds a monopoly on the fishing industry, has been given a $20,000 fish-meal plant. The plant was donated by the United Nations Technical Assistance Program. The cost of installation (estimated at US$46,000 at the exchange rate of 2.16 pesos to US$1) and technical know-how will be supplied by Uruguay.

The new fish plant, manufactured by a British firm, is expected to be in operation by the end of 1958. Fish waste will be converted into a meal for poultry and hog feeding. Production at first will only cover domestic needs, but it is anticipated that eventually fish meal for export will be available.

"CHLORINE" BACTERICIDES IN FISHERY PLANTS

Although there are other bactericides which can be useful in a fish processing plant under certain conditions, the most common and the safest bactericides depend on "free chlorine" for their action. "Free chlorine" solutions quite efficiently kill most surface bacteria, and at the same time they tend to destroy undesirable odors. Suitable solutions of "free chlorine" may be prepared (1) by mixing chlorine gas, directly from a steel cylinder, with water; (2) by diluting a concentrated "liquid chlorine compound," similar to many household liquid bleaches; or (3) by dissolving a "solid chlorine compound," generally calcium hypochlorite. A system using chlorine gas is efficient and effective, but it requires special equipment designed and installed by experts. The liquid and solid chlorine compounds can be purchased from any local chemical or sanitation products supply house. The following is a rough guide for use of chlorine bactericides:

Use	Chlorine: Water	Liquid Compounds with 5¼% Chlorine	Solid Compounds with 50% Chlorine
General plant use . .	1:100,000	2 tbs./40 gal.	⅓ tbs./40 gal.
Rinsing hands	1:10,000	2 tbs./4 gal.	⅓ tbs./4 gal.
Treating washed, smooth surfaces .	1:3,333	6 tbs./4 gal.	1 tbs.[1]/4 gal.
Treating washed, rough surfaces .	1:1,000	20 tbs./4 gal.	3⅓ tbs.[1]/4 gal.

1/Level standard tablespoons. Tbs. = Tablespoons.

Chlorine bactericides are of little value on dirty or slime-covered surfaces. Visible dirt, slime, grease, etc., must first be washed away--best with detergents. Then the chlorine can kill the bacteria, the invisible enemies of good quality. (NFI Flashes, September 14, 1958.)

FEDERAL ACTIONS

Department of Commerce

BUREAU OF FOREIGN COMMERCE

NO EXPORT LICENSE NEEDED FOR CERTAIN EXPORTS TO HONG KONG, INCLUDING FISH OILS:

Exporters now may ship a number of additional commodities to Hong Kong without applying for individual export licenses, the Bureau of Foreign Commerce, U. S. Department of Commerce, announced on October 17, 1958.

Effective on that date, items added to the list of nonstrategic commodities which may be exported under general license GHK without prior application to the Bureau of Foreign Commerce include certain inedible animal and fish oils, stearic acid, and gasoline outboard motors of 15 horsepower and under.

Time-limit license procedures were also revised so that more than one consignee in Western Hemisphere destinations may be covered on one application. The purpose of a time-limit license is so exporters can ship unlimited quantities of certain commodities to a named consignee in a Western Hemisphere country for 1 year under 1 license, instead of having to apply for a license for each shipment.

More detailed information is obtainable from the Bureau of Foreign Commerce's Current Export Bulletin No. 805, dated October 16, 1958.

Federal Maritime Commission

ALASKA SHIP-CARGO RATES AND CHARGES INCREASED:

The Federal Maritime Board ruled on October 9, 1958, in its Docket 828 (General Increases in Alaska Rates and Charges), that the proposed increased ship-cargo rates and charges, and regulations and practices of respondents were found just and reasonable. The ruling came about due to a petition by the Alaska Steamship Company and some of the other large common carriers between United States Pacific coast ports and ports in Alaska for a general 15-percent increase in rates and charges.

The Federal Maritime Board, during consideration of the proposals, heard testimony submitted by the Territory of Alaska, General Services Administration, Department of Defense, Northwest Fish Traffic Committee, and Associated Grocers Incorporated. The decision to allow the 15-percent increase in rates and charges does not apply to carriers not parties to the proceedings.

Prior to this final ruling by the Board, a $7\frac{1}{2}$-percent increase in rates had been granted effective January 30, 1958, and another $7\frac{1}{2}$-percent increase effective April 15, 1958. Therefore, the October 9 ruling by the Board makes permanent rate increases of 15-percent already in effect since April 15, 1958.

Federal Trade Commission

FOOD INDUSTRY INVESTIGATION LAUNCHED:

The Federal Trade Commission has adopted a resolution directing an investigation and study of the food industry, according to an October 13, 1958, news release from that Agency.

In taking the action, the Commission pointed out that many complaints have been received concerning the development in recent years of concentration of power, collusive price action,

and unfair competitive methods in the industry.

The resolution also notes that a goodly number of all Commission antimonopoly investigations is of alleged law violations by industry members.

The investigation is directed toward the integration and concentration of economic power at the retail level of distribution in the industry. However, the Commission emphasized, not only will the practices of retailers be considered, but also those of food wholesalers, manufacturers, distributors, and brokers, if relevant to the investigation.

* * * * *

SEAFOOD PACKER DENIES CHARGES OF ILLEGAL PRICE REDUCTIONS:

A Bellingham, Wash., packing company, its wholly-owned subsidiary, and the president of both firms, have denied (Answer 7202, Seafood) Federal Trade Commission charges of granting favored buyers illegal price reductions in lieu of brokerage.

In answer to a Commission complaint issued July 22, 1958, the subsidiary admits that it packs, distributes, and sells canned seafoods, but the packing company and its president deny they are engaged in this business.

The subsidiary company admits it has made substantial sales to certain direct buyers without utilizing brokers but denies it gave illegal price reductions approximating brokerage, or allowances, which otherwise would have been paid. The complaint had alleged that these practices violate Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act.

The respondents further state that their records were made available to a Commission examiner, and they have never been advised of any violation as alleged in the complaint.

The respondents asked that the complaint be dismissed.

* * * * *

SHRIMP COMPANY CHARGED WITH PAYMENT OF ILLEGAL BROKERAGE:

The Federal Trade Commission on October 27, 1958, charged (Complaint 7274 Shrimp) a New Orleans, La., shrimp firm with making illegal brokerage payments to some customers on direct sales of its shrimp.

A Commission complaint charges that the firm, whose sales exceed $1 million annually, made approximately 60 percent of such sales direct to certain favored buyers without utilizing the services of its brokers and, on these direct sales, granted allowances which approximated and were in lieu of brokerage or gave the buyers lower prices reflecting this brokerage.

These practices, the complaint concludes, violate Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act.

The firm was granted 30 days in which to file answer to the complaint. A hearing was scheduled December 18 in New Orleans before a Commission hearing examiner.

* * * * *

CONSENT ORDER PROHIBITING ILLEGAL BROKERAGE BY SEATTLE CANNED SALMON BROKER APPROVED:

The Federal Trade Commission on November 3, 1958, approved a consent order (7099, Food Products) prohibiting a Seattle, Wash., primary broker of canned salmon and other food products from making illegal brokerage payments to its customers.

The Commission adopted an initial decision by the Hearing Examiner based on an order agreed to by the company and the Commission's Bureau of Litigation.

The Commission's complaint, issued March 27, 1958, had alleged that the firm favored certain buyers with substantial allowances in lieu of brokerage or price concessions reflecting brokerage.

According to the complaint, these typical means were used to make such allowances to favored buyers: (1) selling at net prices less than the amount accounted for to the packer-principals; (2) granting price deductions, a part or all of which were not charged back to the packer-principals; and (3) taking reduced brokerage on sales involving price concessions.

These practices, the complaint concluded, violate Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act.

The firm's president is joined in the order prohibiting these practices.

The agreement is for settlement purposes only and does not constitute an admission by the company or its president that they have violated the law.

Department of the Interior

FISH AND WILDLIFE SERVICE

HEARINGS ON ALASKA COMMERCIAL FISHING REGULATIONS:

Public hearings on the proposal to adopt amendments to regulations for the protection of commercial fisheries in Alaska were announced in the November 14, 1958, Federal Register by the Department of the Interior.

Publication of the dates of the public meetings in December followed the decision by Secretary of the Interior Fred A.

Seaton on November 8, 1958, to propose elimination of all fish traps except those owned by Indian tribes or villages. Secretary Seaton announced this decision in Juneau, Alaska, on November 9.

The hearings were held in Seattle, Wash., on December 4, 5, and 6; Juneau, Alaska, December 10, 11, and 12; and Anchorage, Alaska, December 17, 18, and 19.

The proposal to eliminate fish traps in the pending regulations is in accord with instructions from Secretary Seaton to "adjust our actions as quickly as possible to the desires of the Alaskans in regard to the disposition of their natural resources."

The use of fish traps in Alaskan waters has been a controversial issue for many years. Twice the people of Alaska have voted in referendum to abolish them. The first expression was in October 1948 when the vote was 19,712 to 2,634 for the discontinuance of the traps. The second came in April 1956 when a second referendum favored elimination of the traps, 20,872, to 3,946.

The note as it appeared in the Federal Register follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Parts 101–115]

ALASKA COMMERCIAL FISHERIES

PROTECTION

Pursuant to the Administrative Procedure Act approved June 11, 1946 (60 Stat. 237; 5 U. S. C. 1001 et seq.), notice is hereby given that the Secretary of the Interior intends to adopt amendments to existing regulations governing the time during and the means and methods by which commercial fish and shellfish may be taken in the waters of Alaska. Amendments to existing regulations for the protection of the commercial fisheries of Alaska are to be adopted under the authority contained in the Act of June 6, 1924, as amended and supplemented (43 Stat. 465, 48 U. S. C. 221 et seq.), are to become effective on or about March 1, 1959, and are to continue in effect thereafter until further notice.

Interested persons are hereby invited to participate in the adoption of amendments to the regulations by presenting their views, data, or arguments in writing to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington 25, D. C., on or before December 31, 1958, or by presenting their views orally or in writing at a series of open discussions scheduled to be held as follows:

Seattle, Wash., December 4, 5, and 6.
Juneau, Alaska, December 10, 11, and 12.
Anchorage, Alaska, December 17, 18, and 19.

The hour and place of each meeting will be announced by the local representative of the Bureau of Commercial Fisheries at the cities indicated above.

Dated: November 8, 1958.

FRED A. SEATON,
Secretary of the Interior.

Interstate Commerce Commission

RAIL EXPRESS RATES AND CHARGES FOR MOST FISHERY PRODUCTS UNCHANGED:

Most of the fishery products shipped via the Railway Express Agency were exempted from the general 15-percent increase in rates and charges approved by the Interstate Commerce Commission on October 13, 1958. This is the seventh general increase in rates and charges made effective since the end of World War II.

This decision was rendered after extensive hearings in the Commission's docket Ex Parte 210. A 15-percent increase in class rates was approved, but no increase was allowed in rates for less than carload "commodity rated" fish and shellfish traffic which accounts for the bulk of fishing industry express shipments. No increase in the present minimum charge of $2.01 was granted nor were proposed increases on carload traffic allowed. The exceptions to the above fishery product exemptions includes isolated shipments on routes where no commodity rates exist which are billed at class rates and for lobster shipments which are always billed at a percentage of the first-class rate.

The Commission did allow a 15-percent increase in reicing charges, but in doing so stated "We approve the proposed increase in reicing charges. However, the respondent is admonished to give prompt consideration to improving its reicing service so as to remove shipper complaint with respect thereto."

Note: Also see Commercial Fisheries Review, February 1958, p. 81.

Small Business Administration

PROPOSED REGULATIONS FOR SMALL BUSINESS INVESTMENT COMPANIES ANNOUNCED:

The Federal Register of October 29, 1958, announced the proposed regulations governing the establishment and operation of small business investment companies chartered or licensed by the Small Business Administration under the Small Business Investment Act of 1958.

Interested persons were requested to submit written comments or suggestions to the Small Business Investment Division, Small Business Administration, Washington 25, D. C.

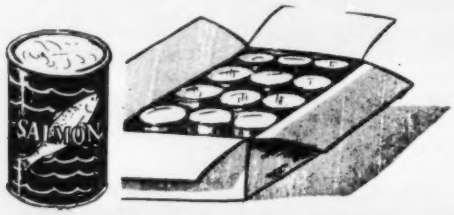
Treasury Department

BUREAU OF CUSTOMS

FINDS THAT NO SALES OF CANNED PINK SALMON FROM CANADA WERE MADE AT LESS THAN FAIR VALUE:

A complaint received by the U. S. Bureau of Customs claimed that canned pink salmon from Canada was being sold in the United States at less than fair value within the meaning of the Antidumping Act of 1921.

The Bureau has determined that canned pink salmon from Canada is not



being, nor is likely to be, sold in the United States at less than fair value within the meaning of section 201 (a) of the Antidumping Act, 1921, as amended (19 U. S. C. 160 (a)).

The Canadian companies concerned, after being apprised of the complaint, immediately took steps to revise their pricing. As a result, no sales have been made to the United States since that time which could be considered to have been made at a dumping price. Assurance has been secured from the Canadian companies involved that they do not intend to sell in the future at dumping prices.

This determination and the statement of reasons therefor were published pursuant to section 201 (c) of the Antidumping Act, 1921, as amended (19 U. S. C. 160 (c)) in the Federal Register of October 25, 1958.

White House

SUOMELA APPOINTED TO NORTH PACIFIC FISHERIES COMMISSION:

The President of the United States on October 10, 1958, appointed Arnie J. Suomela, Commissioner of the U. S. Fish

Arnie J. Suomela

and Wildlife Service, to serve on the North Pacific Fisheries Commission. Mr. Suomela replaces Ross L. Leffler, Assistant Secretary for Fish and Wildlife of the U. S. Department of the Interior, who resigned from the Commission because of the pressure of other duties.

The North Pacific Fisheries Commission which consists of four representatives from the United States,

Canada, and Japan was established in 1953 to promote the conservation of the fishery resources of the North Pacific and to administer research programs.

Suomela, from Ilwaco, Pacific County, Wash., received his bachelor's and master's degrees from the College of Fisheries of the University of Washington. He was formerly Director of the Oregon Fish Commission and has held various positions with the U. S. Fish and Wildlife Service. He is also a member of the International Pacific Salmon Fisheries Commission.

ELECTRICALLY-KILLED SALMON REMAIN FRESH FOR EXCEPTIONALLY LONG PERIOD

A system of electrical killing of salmon has now been incorporated in a fishing weir of a fishing company in Ireland. The fish killed by shock treatment have subsequently been shown to remain fresh for an exceptionally long period. They remained fresh when held without icing under conditions and for periods in which fish killed under the normal system of clubbing would have started to deteriorate.

A prototype cardboard salmon box of a new type has also been designed to replace the traditional wooden boxes. The cardboard containers are particularly suitable for the packing of grilse or the smaller salmon (The Fishing News, May 24, 1957).

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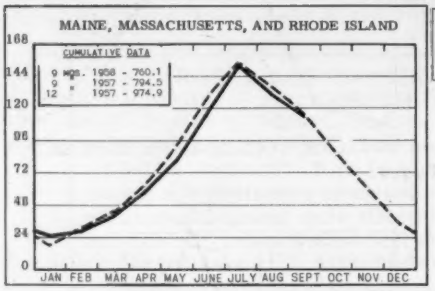
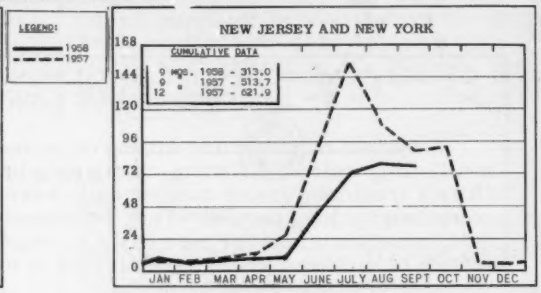
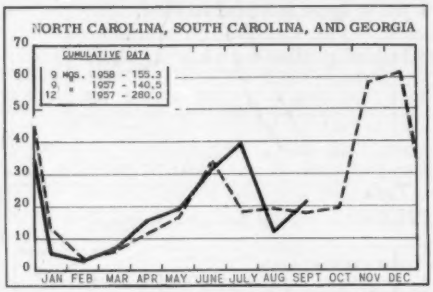
CHART 1 - FISHERY LANDINGS for SELECTED STATES

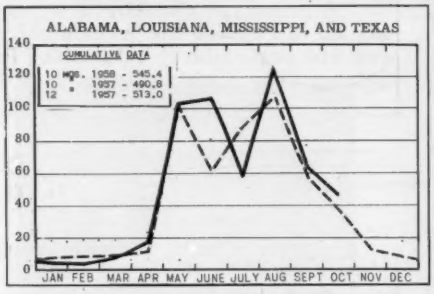
In Millions of Pounds

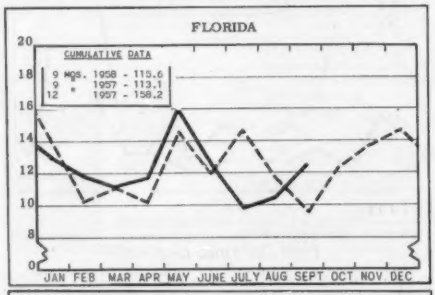


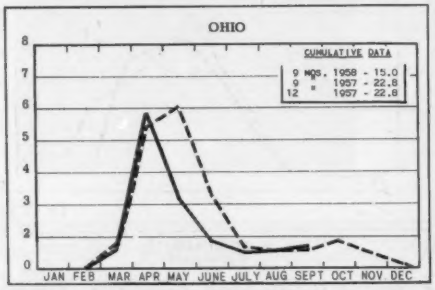


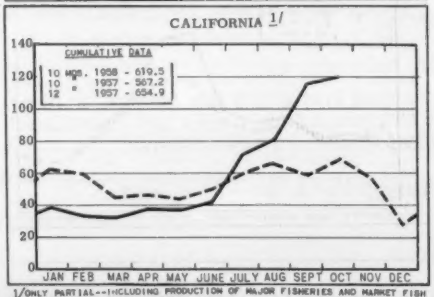
LEGEND:
1958
1957

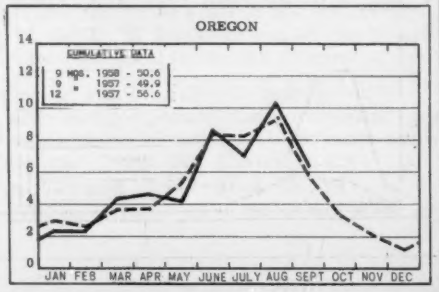








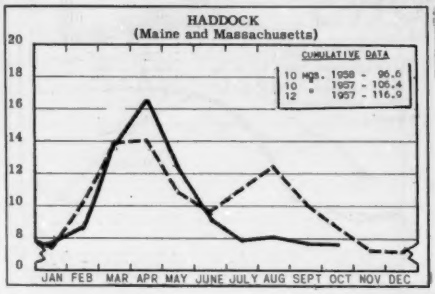




1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds


HADDOCK
(Maine and Massachusetts)
CUMULATIVE DATA
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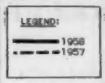
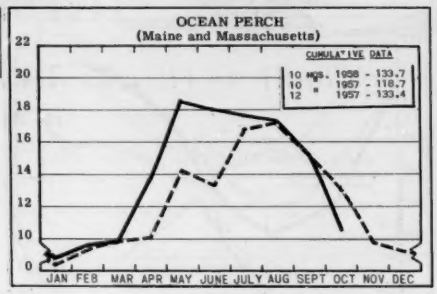
10 " 1957 - 105.4
12 " 1957 - 116.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC




OCEAN PERCH
(Maine and Massachusetts)
CUMULATIVE DATA
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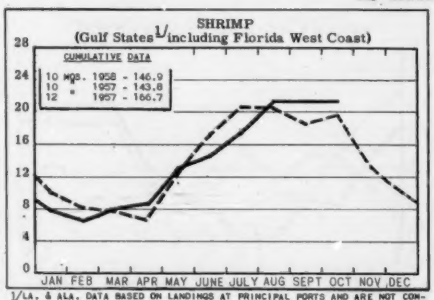
12 " 1957 - 133.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Millions of Pounds


SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
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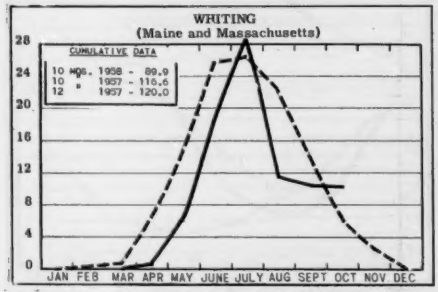
10 " 1957 - 143.8
12 " 1957 - 166.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.


WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
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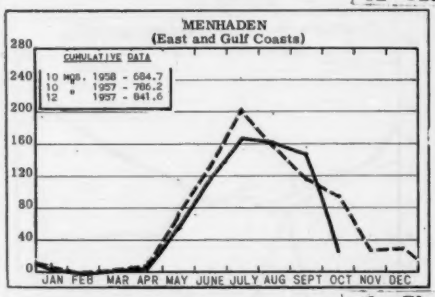
12 " 1957 - 120.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
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12 " 1957 - 841.6
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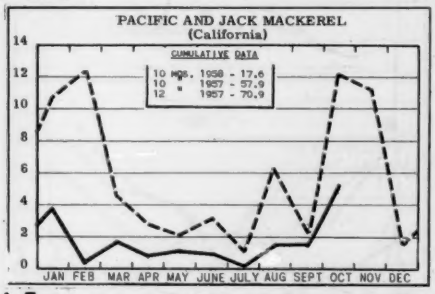
PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
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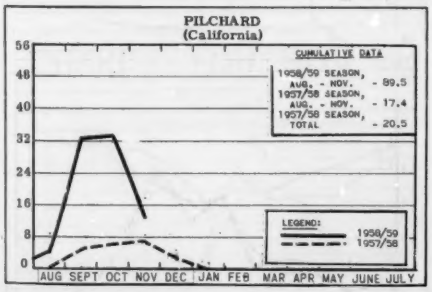
12 " 1957 - 70.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons



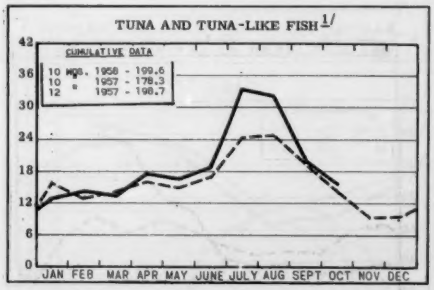
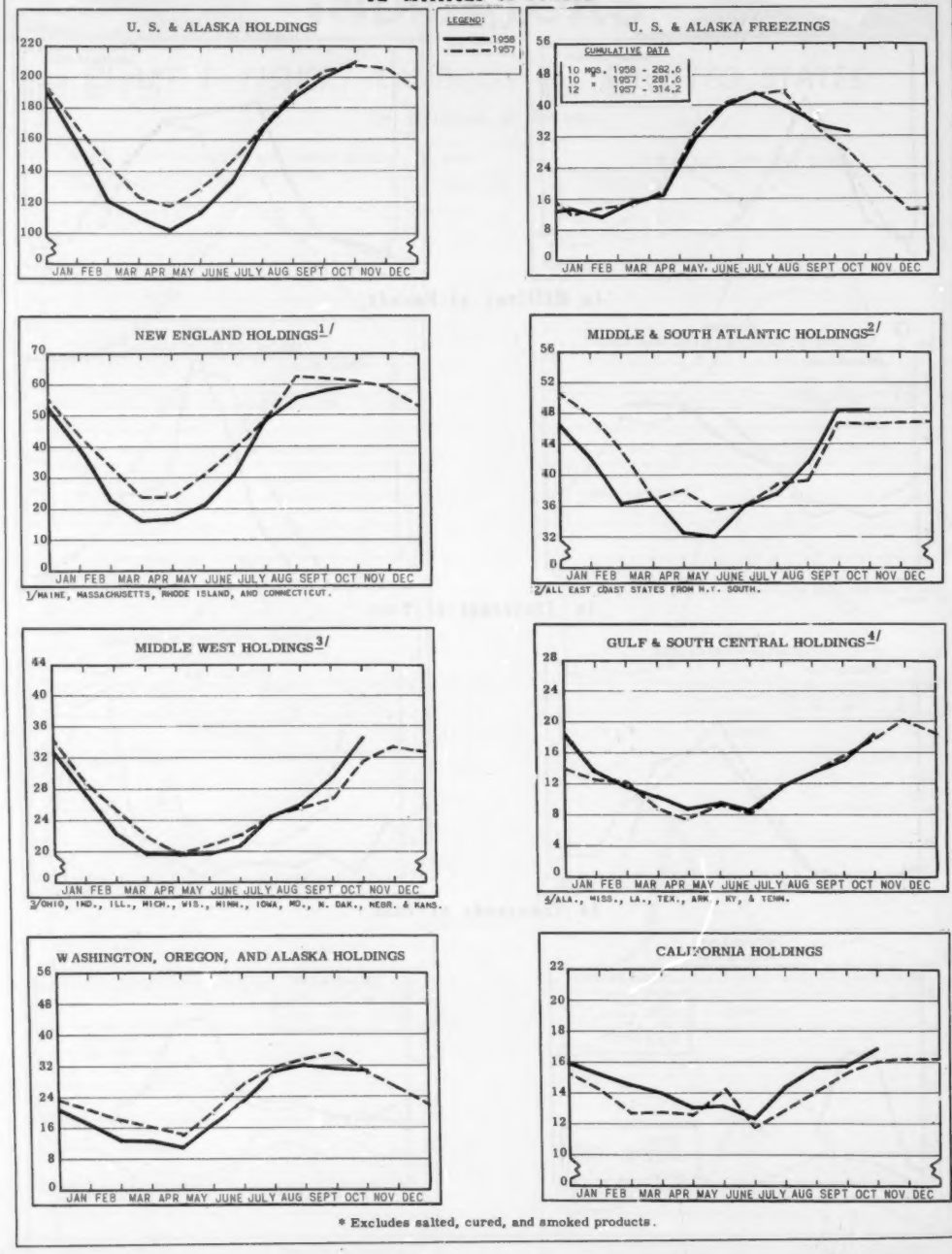

TUNA AND TUNA-LIKE FISH 1/
CUMULATIVE DATA
10 MOS. 1958 - 199.6
10 " 1957 - 178.3
12 " 1957 - 198.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. & ALASKA HOLDINGS
LEGEND:
1958
1957
U. S. & ALASKA FREEZINGS
CUMULATIVE DATA
10 MOS. 1958 - 282.6
10 " 1957 - 281.6
12 " 1957 - 314.2
NEW ENGLAND HOLDINGS 1/
MIDDLE & SOUTH ATLANTIC HOLDINGS 2/
MIDDLE WEST HOLDINGS 3/
GULF & SOUTH CENTRAL HOLDINGS 4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

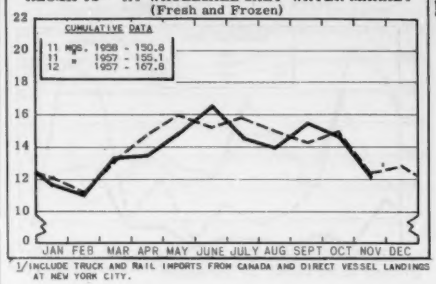
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

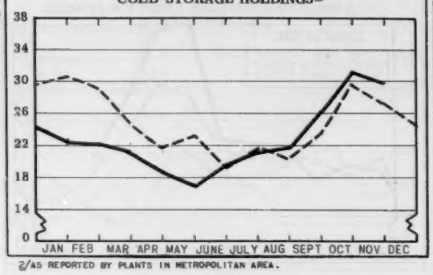
NEW YORK CITY

RECEIPTS[1/] AT WHOLESALE SALT-WATER MARKET (Fresh and Frozen)



1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

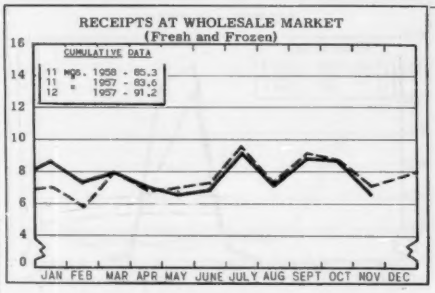
COLD-STORAGE HOLDINGS[2/]



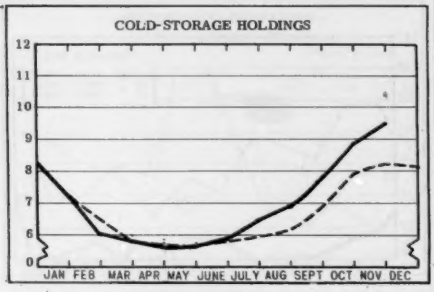
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHICAGO

RECEIPTS AT WHOLESALE MARKET (Fresh and Frozen)

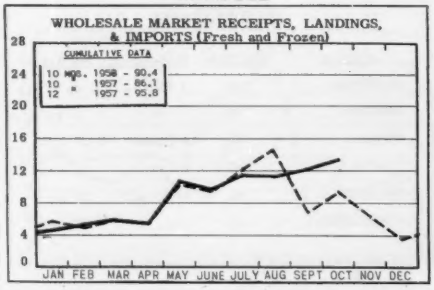


COLD-STORAGE HOLDINGS



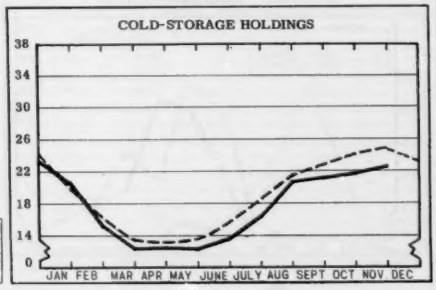
SEATTLE

WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (Fresh and Frozen)



BOSTON

COLD-STORAGE HOLDINGS



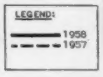
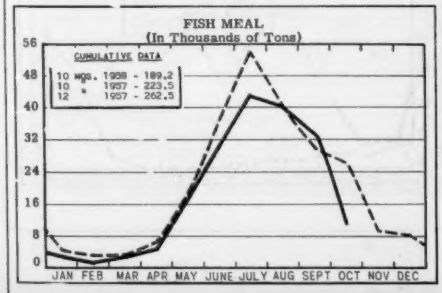


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

FISH MEAL (In Thousands of Tons)



FISH OIL (In Millions of Gallons)

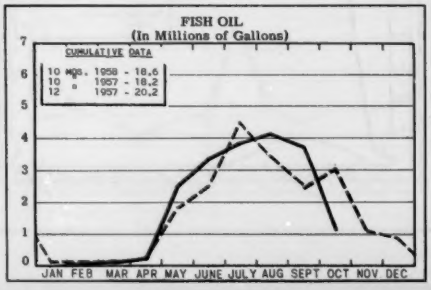
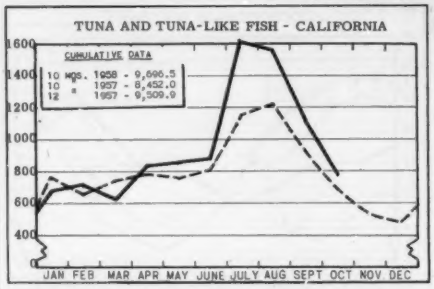
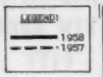
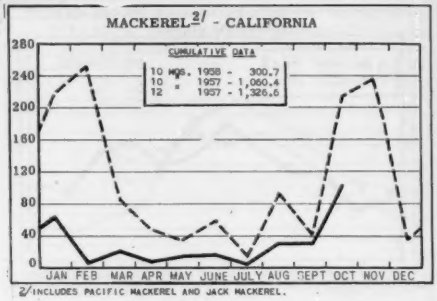


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

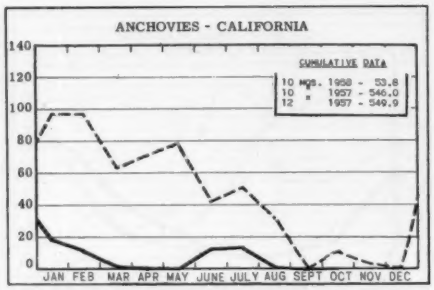
In Thousands of Standard Cases

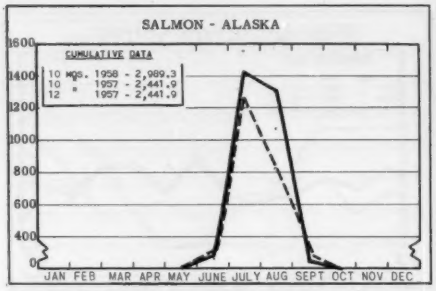


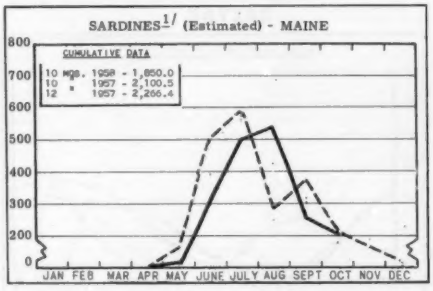




2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

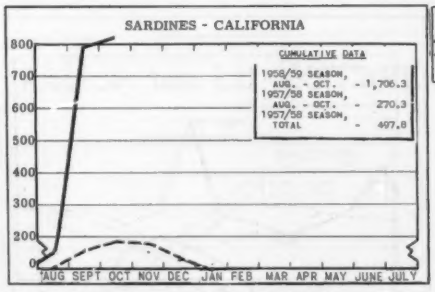


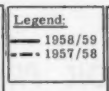




STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.





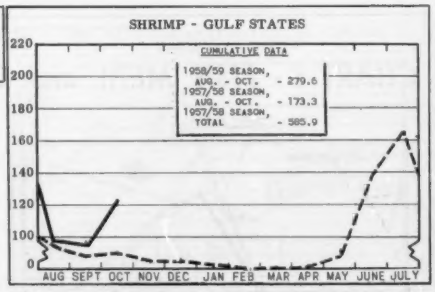
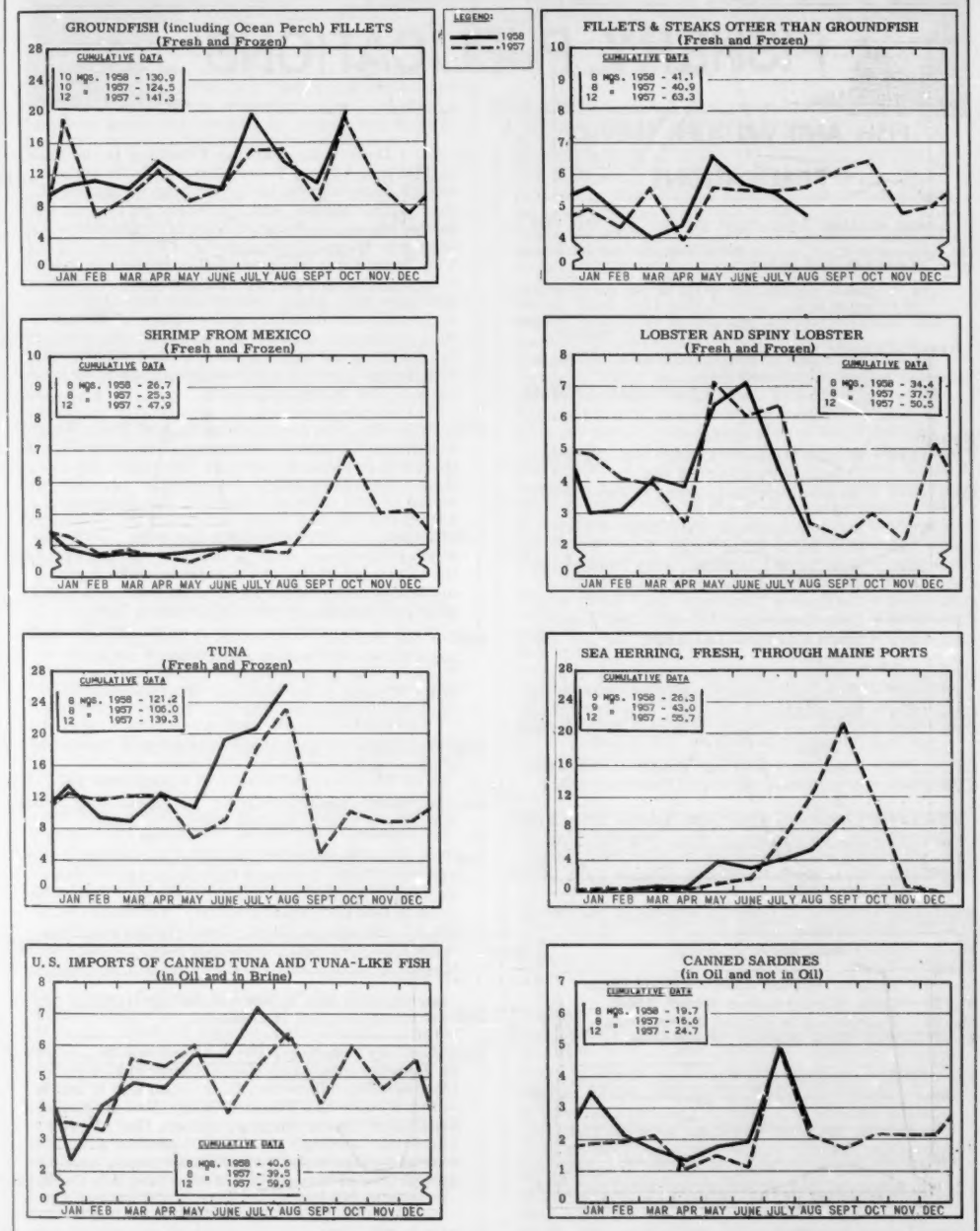


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (including Ocean Perch) FILLETS
(Fresh and Frozen)
CUMULATIVE DATA
10 MOS. 1958 - 130.9
10 " 1957 - 124.5
12 " 1957 - 141.3
LEGEND:
1958
1957
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FILLETS & STEAKS OTHER THAN GROUNDFISH
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1958 - 41.1
8 " 1957 - 40.9
12 " 1957 - 63.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
SHRIMP FROM MEXICO
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1958 - 26.7
8 " 1957 - 25.3
12 " 1957 - 47.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
LOBSTER AND SPINY LOBSTER
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1958 - 34.4
8 " 1957 - 37.7
12 " 1957 - 50.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
TUNA
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1958 - 121.2
8 " 1957 - 106.0
12 " 1957 - 139.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
8 MOS. 1958 - 26.3
8 " 1957 - 43.0
12 " 1957 - 55.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
U.S. IMPORTS OF CANNED TUNA AND TUNA-LIKE FISH
(in Oil and in Brine)
CUMULATIVE DATA
8 MOS. 1958 - 40.6
8 " 1957 - 39.5
12 " 1957 - 59.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
CANNED SARDINES
(in Oil and not in Oil)
CUMULATIVE DATA
8 MOS. 1958 - 19.7
8 " 1957 - 16.0
12 " 1957 - 24.7
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
FL - FISHERY LEAFLETS.
SSR. - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-1836 - Alaska Fisheries, 1957 Annual Summary (Revised), 8 pp.
CFS-1875 - Massachusetts Landings, June 1958, 5 pp.
CFS-1879 - Maine Landings, July 1958, 3 pp.
CFS-1880 - New Jersey Landings, July 1958, 3 pp.
CFS-1881 - New York Landings, July 1958, 4 pp.
CFS-1886 - Texas Landings, July 1958, 3 pp.
CFS-1888 - California Landings, May 1958, 4 pp.
CFS-1889 - Ohio Landings, August 1958, 2 pp.
CFS-1891 - South Carolina Landings, August 1958, 2 pp.
CFS-1892 - Alabama Landings, July 1958, 2 pp.
CFS-1893 - Georgia Landings, August 1958, 2 pp.
CFS-1894 - Mississippi Landings, July 1958, 2 pp.
CFS-1895 - North Carolina Landings, August 1958, 3 pp.
CFS-1896 - Fish Meal and Oil, August 1958, 2 pp.
CFS-1897 - Louisiana Landings, February 1958, 2 pp.
CFS-1899 - Louisiana Landings, March 1958, 2 pp.
CFS-1903 - Maine Landings, August 1958, 3 pp.
CFS-1904 - Florida Landings, August 1958, 7 pp.
CFS-1906 - New York Landings, August 1958, 4 pp.

Wholesale Dealers in Fishery Products (Revised):
SL- 7 - New Jersey, 1958.
SL-10 - Maryland, 1958.
SL-20 - Texas, 1957.
SL-26 - Illinois (Great Lakes Area), 1958.
SL-29 - Ohio (Great Lakes Area), 1958.
SL-30 - Pennsylvania (Great Lakes Area), 1958.
SL-31 - New York (Lakes Area), 1958.

FL-336LL - Commercial Fisheries Outlook, October-December 1958, 45 pp. processed. Covers the outlook at a glance; general business conditions; the food situation; general fishery situation; specific marketing situations as applied to salt-water fish, shellfish, fresh-water fish, and industrial products; and market terms.

FL-470 - Double-Rig Shrimp Trawling in the Gulf of Mexico, 12 pp., September 1958. A recent major development in the shrimp fisheries of the Gulf of Mexico and the South Atlantic Coast is the widespread conversion of conventional trawlers from single-trawl to two-trawl rigs. The immediate purpose of this leaflet is to provide owners of conventionally-rigged shrimp trawlers with basic information required for conversion to double-rig trawling. Although this method of shrimping has reached a successful stage in its development, it is still evolving, and improvements are frequently made by members of the shrimp industry.

SSR-Fish. No. 259 - Age, Length, and Body Weight of Salmon Caught by Japanese High Seas Fleets in North Pacific, by George Tanonaka, 14 pp., illus., February 1957. Data on the age composition of red salmon caught by the Japanese high-seas salmon fleets indicates the dominance of 2-year-in-ocean reds in the even years and 3-year-in-ocean reds in the odd years. In 1956 the majority of the chum salmon were 5 years old and mostly mature. The pink salmon available to the fishery were all mature fish.

SSR-Fish. No. 265 - Physical Oceanographic, Biological, and Chemical Data--South Atlantic Coast of the United States (M/V Theodore N. Gill), Cruise 6, by William W. Anderson and Jack W. Gehringer, 103 pp., illus., July 1958.

Sep. No. 528 - An Economic Analysis of Freezing Fish at Sea.

Sep. No. 529 - Contribution to the Chemistry of the King Crab (Paralithodes camtschatica).

Sep. No. 530 - Research in Service Laboratories (November 1958): Contains these articles--"Fish Spoilage - I - Determination of Bacterial Metabolites by Gas Chromatography;" "Technical Note No. 47 - Steelhead Trout - Description and Proximate Composition;" "Possible New Use for Oyster Liquors;" and "Clue to Causes of Odor in Fish Oil."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, September 1958, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans

French Market; and sponge sales at Tarpon Springs, Fla; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, August 1958; September 1958; 12 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh-water fish, salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the months indicated.

(New York) Monthly Summary - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, September 1958, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces; for the month indicated.

(Seattle) Monthly Summary - Fishery Products, September 1958, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle, Astoria (Oregon), Alaska, and British Columbia wholesale dealers; also Northwest Pacific halibut, shrimp, and salmon landings; for the month indicated.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Analysis of Catch Statistics of the Hawaiian Skipjack Fishery, by Daniel T. Yamashita, Fishery Bulletin 134 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 58), 28 pp., illus., printed, 25 cents, 1958. The catch statistics of the Hawaiian skipjack fishery and its associated live-bait fishery for the period 1900 through 1953 are brought together from all available records. The various facts of the live-bait fishery, the only important one in the central Pacific, the methods of data collection for the skipjack and live-bait fisheries, and the completeness and accuracy of the catch records are analyzed. A description of the 1953 fishing fleet and the essential specifications of the sampans in the Territory of Hawaii, information which may be useful in evaluating future changes in catch per unit of effort, are presented.

Relative Value of Ten Genera of Micro-Organisms as Foods for Oyster and Clam Larvae, by Harry C. Davis and Robert R. Guillard, Fishery Bulletin 136 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 58), 16 pp., illus., printed, 15 cents, 1958. A report of the results of some feeding experiments designed to determine the relative food value to larvae of oysters and clams of representatives from ten genera of micro-organisms, and of one experiment designed to test the effect on larval growth of five different concentrations of the two micro-organisms that proved to be of most value as foods. Findings show that the presence, or perhaps thickness, of cell walls and the degree of toxicity of the metabolites are probably important factors in determining the usability of micro-organisms as foods for bivalve larvae.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

BAIT FISH:

A Study of the Age, Growth, Sexual Maturity, and Spawning of the Anchoveta (CETENGRAULIS MYSTICETUS) in the Gulf of Panama, by Gerald V. Howard and Antonio Landa, 79 pp., illus., printed in English and Spanish. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, vol. II, no. 9, pp. 391-467.) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1958. More than 27,000 fish from 231 collections captured in the Gulf of Panama between June 1951 and January 1956 are the basis of this study of the age, growth, sexual maturity, and spawning season of anchovetas in that area. The collections came from three sources, those made by California-based tuna fishing vessels, collections by personnel at the Commission's laboratory in Panama, and samples obtained from a biologist of the Food and Agriculture Organization of the United Nations. Estimates of age and rate of growth were made by studying the temporal progression of modal-size groups from monthly length-frequency distributions. A section of this report discusses the methods for making age and growth estimates, analysis of length-frequency data, and relative abundance of age groups. Sexual development and time of spawning were determined from gross examination of ovaries and measurements of ovarian eggs. A section on the sexual maturity and spawning discusses methods for making estimates, time and frequency of spawning, frequency of spawning within a season, age at first maturity, age in relation to time of annual spawning, consideration of a "gonad index" to sexual maturity, and application of the gonad index.

CALIFORNIA:

Age and Length Composition, Pacific Coast Catches Sardines and Pacific Mackerel, 1955-56 and 1956-57 Seasons, and the Northern Anchovy, 1954-55 Through 1956-57 Seasons, Fish Bulletin No. 106, 72 pp., illus., printed. Department of Fish and Game, Sacramento, Calif., 1958. The age and length composition of the catches of three of the more important pelagic marine fishes of California are included in this bulletin. The data are presented in four separate papers.

CANADA:

Progress Reports of the Pacific Coast Stations, no. 111, 28 pp., illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada, August 1958. Contains, among others, the following articles: "The Magnitude of Herring Spawn Losses Due to Bird Predation on the West Coast of Vancouver Island," by D. N. Outram; "The Tagging of Spring and Coho Salmon in the Strait of Georgia in 1956," by D. J. Milne and E. A. R. Ball; "Adult Returns of Pink Salmon from the 1954 Fraser River Planting," by W. Percy Wickett; "The Recent Rise in Landings of Whole Fish for Mink Feed in British

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Columbia," by C. R. Forrester; and "A Comparison of the Nutritive Value of Condensed Herring Solubles Prepared by Acid and Enzyme Treatments," by B. E. March, Jacob Biely, J. McBride, R. A. MacLeod, and D. R. Idler.

CANNING:

"A Bacteriological and Chemical Study of Certain Problems in Lobster Canning," by Guilford B. Reed and D. J. MacLeod, article, Contributions to Canadian Biology, vol. 2, no. 1, 1924, pp. 3-29, printed. University of Toronto Press, Toronto, Ontario, Canada.

COD:

"Lipid Changes in Iced Cod. 1--Phospholipids," by J. A. Lovern, June Olley, and Helen A. Watson, article, The Biochemical Journal, vol. 70, no. 1, September 1958, pp. 2p-3p, printed. Cambridge University Press, Bentley House, 200 Euston Road, London N. W. 1, England. A report of research in which gutted cod were stored in ice for up to 56 days, samples withdrawn periodically, the flesh lipids extracted and fractionated chromatographically on silicic acid. Results showed that enzymic degradation appeared to occur at the same rate in all the various phospholipids present and to affect both fatty acid ester linkages.

"Lipid Changes in Iced Cod. 2--Non-Phosphorylated Lipids," by J. A. Lovern and June Olley, article, The Biochemical Journal, vol. 70, no. 1, September 1958, p. 3p, printed. Cambridge University Press, Bentley House, 200 Euston Road, London N. W. 1, England. In experiments carried on at Torry Research Station, Aberdeen, Scotland, free sterol decreased throughout the storage period, reaching about one-twelfth of its initial value after 56 days.

Studies on the Proteins of Fish Skeletal Muscle. 5--Molecular Weight and Shape of Cod Fibrallar Proteins, by J. J. Connell, article, The Biochemical Journal, vol. 70, no. 1, September 1958, pp. 81-91, illus., printed. Cambridge University Press, Bentley House, 200 Euston Road, London, N. W. 1, England. The size and shape of the cod fibrillar proteins are very similar to those of the rabbit proteins. The unusual properties of the fish proteins cannot be explained therefore on this basis, states the author in conclusion.

CONSUMPTION:

"Fishing for Consumers," by J. Fridthjof, article, United Nations Review, vol. 5, no. 1, July 1958, pp. 42-44, printed. United Nations, New York, N. Y. An expert tells how he made seafood popular in South America and Yugoslavia.

COOPERATIVES:

Cooperatives as a Means of Fostering Fishery Development, FAO Fisheries Paper No. 9, 6 pp., processed. Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, June 1958. Extracts from the agenda and report of the Third FAO Regional Conference for Asia and the Far East, Bandung, October 8-19, 1956. Emphasis is placed on the current programs, the middleman problem, education and training, and recommendations to the Conference. The Conference discussed the value of cooperative organizations in fisheries, an investigation of the functions performed by middlemen and cooperatives respectively and their influence on fish production and trade; and a training center in fisheries cooperatives and administration to be conducted in 1957 under FAO's Expanded Technical Assistance Program. The training center was subsequently held in Australia, December 1957-January 1958.

DISEASES OF FISH:

Diseases of Fishes of the Western North Atlantic. VI--Geographic Discontinuity of Myxosporidiosis in Immature Herring from the Gulf of Maine, by Carl J. Sindermann, Research Bulletin No. 29, 20 pp., illus., printed. Department of Sea and Shore Fisheries, Augusta, Me., December 1957. This paper is one of several reports resulting from the herring investigation carried on jointly by the U. S. Fish and Wildlife Service, the Maine Department of Sea and Shore Fisheries, and the Maine Sardine Industry. Myxosporidiosis (gross symptoms are opaque white fusiform intramuscular cysts) of immature sea herring is distributed discontinuously along the Maine coast, with abundant infections in Casco Bay and southward. The geographic distribution of this infection suggests absence of large-scale movements of sardine herring along the Maine coast, and a separation of such immature fish from eastern and western Maine, at least during the latter part of the first and much of the second years of life, concludes the author.

FATTY ACIDS:

"Studies on the Conjugated Fatty Acids. Part III--Fat Absorption and Distribution Study in Fish--1. Application of the Conjugated Fatty Acids for the Research on the Fat Metabolism of the Carp, Cyprinus Carpio Linne," by Yasuhiko Tsuchiya and Mitsu Kayama, article, The Tohoku Journal of Agricultural Research, vol. IX, no. 1, March 1958, pp. 41-52, illus., printed. Faculty of Agriculture, Tohoku University, Sendai, Japan.

FISH COOKERY:

"Smoke Barrel Cookery," article, Institutions, no. 42, June 1958, pp. 41-43, printed. Domestic Engineering Company, 1801 Prairie Avenue, Chicago 16, Ill. According to the author, construction of a barrel for smoke-cooking fish is quite simple, requiring only a minimum of work and can be quickly done by the operator wishing to serve such a luncheon. The principal component is a 40-gallon charred oak barrel or similar container. Any non-resinous hard wood can be used to produce the smoke. Although salmon is often prepared in this way, the picturesque "smoke barrel" method can be used for many other varieties of fish including cod, whitefish, haddock, halibut, and lake trout.

FISHERY RESEARCH:

"Fishery Research," by Arthur D. Bradford, article, Pennsylvania Angler, vol. 27, no. 10, October 1958, pp. 2-6, illus., printed, single copy

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10 cents. Pennsylvania Fish Commission, Harrisburg, Pa. Includes definitions of fishery research and discusses fish management research, fish cultural research, and general research projects conducted by the Pennsylvania Fish Commission. The author discloses the fact that last year, in this country, about $10 billion were spent on research of all types and during this period, the combined outlays by all the states and the federal government for all types of fishery research amounted to less than $6 million annually.

FOOD AND AGRICULTURE ORGANIZATION:

2nd World Fishing Boat Congress, 16 pp., April 5-10, 1959, Rome. Prospectus. Food and Agriculture Organization of the United Nations, Rome, Italy. (Note: The source for obtaining this publication, shown in Commercial Fisheries Review, September 1958, p. 127, was incorrect.) A. W. Anderson, Assistant Director, U. S. Bureau of Commercial Fisheries, Washington 25, D. C., has been appointed by the Government of the United States to be the official liaison officer with the Food and Agriculture Organization for the forthcoming second World Fishing Boat Congress, which will be held at FAO headquarters, April 5-10, 1959. U. S. Naval architects, boat builders, marine engineers, and others wishing to attend the Congress should apply to A. W. Anderson for details.

Current Bibliography for Fisheries Science, 102 pp., processed. Food and Agriculture Organization of the United Nations, Rome, Italy, September 1958. Contains a taxonomic index, a geographic index, and a references and author index.

Fishery Programs in Relation to Agricultural and Economic Planning, prepared by the FAO Secretariat, FAO Fisheries Paper No. 10, 10 pp., processed. Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, June 1958. Report of the Third Meeting of the Working Party of the Economic Commission for Asia and the Far East on economic development and planning. Covers special considerations influencing fishery development planning and includes sections on nutritional aspects and demand, opportunities for development, relationship between fisheries and general economic development, social and institutional factors, and investment. The general heightening of economic activity, including the spread of industrialization accompanied by urbanization and higher per capita incomes is expected to increase the demand for fish products while providing more facilities for their distribution.

Indo-Pacific Fisheries Council Proceedings, 6th Session, Tokyo, Japan, 30th September-14th October, 1955, Section I (188 pp.), Sections II and III (274 pp.), illus., printed. Indo-Pacific Fisheries Council Secretariat, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand, 1957. Section I describes the business covered at the meetings and the work of the Committees. Section II covers in detail the technical papers presented. Section III presents a report on the Symposium on Prawn Fishery held during the 6th Session of the Council.

Role of Government in Fisheries Development, FAO Fisheries Paper No. 11, 8 pp., processed. Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, July 1958. Extracts from the agenda and report of the Third Regional Conference for Asia and the Far East, Bandung, October 8-19, 1956. Contains sections on fishery policies and programs, government fishery services, and coordination of government services.

World Fisheries: General Trends and Outlook with Examples from Selected Countries, FAO Fisheries Paper No. 12, 29 pp., printed. Reprint from The State of Food and Agriculture - 1956, Chapter IV. Fisheries Division, July 1958. Food and Agriculture Organization of the United Nations, Rome, Italy. Describes in detail the characteristics of world fish production and trade, Government policies in relation to the fishery industries, typical cases of fishery development under different economic influences, and current development programs and outlook. Widespread radical changes are not expected to occur in underdeveloped fisheries in the near future, but this may be explained by the fact that fishery policies are still far from being coordinated with general economic and food policies, that the available public services are weak and inadequately staffed by comparison with agriculture, and that these are often more limiting factors than the intrinsic technical difficulties of introducing improvements.

GHANA:

Annual Report of the Fisheries Department, 1957, 22 pp., illus., printed, 2s.6d. (35 U. S. cents). Government Printing Department (Publications Branch), Accra, Ghana, 1958. A report of Ghana's Fisheries Department on its activities during 1957 in the sea and river fisheries. Throughout the year the Department's chief responsibility was to extend and establish the operations of the motor fishing fleet. Statistical tables and graphs include data on trawl catches by species of fish and shellfish and by months.

INTERNATIONAL COMMISSIONS:

(International North Pacific Fisheries Commission) Annual Report for the Year 1957, 96 pp., illus., printed. University of British Columbia, Vancouver 8, B. C., Canada, 1958. The Commission was established by Convention between Canada, Japan, and the United States for the conservation of the fisheries resources of the North Pacific Ocean, on June 12, 1953. This report presents a summary of action taken by the Commission at its 1957 annual meeting, which was held in Vancouver, B. C., Canada, from November 4-8, 1957, a summary of administrative activities for the year, and progress reports on research conducted by the member governments under the Commission's program. Research in 1957 was focused on the mid-ocean area where previous studies showed that inter-

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mingling of salmon from the two continents would be most likely to occur. The investigations have disclosed that salmon are more or less continuously distributed across the ocean from Asiatic to North American shores. An extensive zone of intermingling of stocks from the two continents was found in the central North Pacific. Not all stocks from the two continents, however, have been found in the area of intermingling. Future investigations will be intensified and concentrated on the objective of defining the extent, nature, and variability of the intermingling of the continental stocks of salmon. Investigations of the king crab (Paralithodes camtschatica) of the Eastern Bering Sea are being conducted for the Commission by agencies of the United States and Japan, under the provisions of Article III(1) (c)(i) of the Convention. Studies of population size, growth rates, and the effects of ocean currents on the distribution of larvae are progressing.

INTERNATIONAL CONFERENCES:

Participation of the United States Government in International Conferences, July 1, 1956-June 30, 1957. Department of State Publication 6670, 226 pp., printed, 60 cents. Office of International Conferences, Department of State, Washington, D. C., 1958. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Describes, among others, the following conferences: Indo-Pacific Fisheries Council; Seventh Session (May 13-27, 1957), Bandung; International Council for the Exploration of the Sea (ICES), Forty-fourth Council Meeting and Special Symposium on the Composition of Herring Stocks (Sept. 25-Oct. 9, 1956), Copenhagen; and International Whaling Commission, Eighth Meeting (July 16-20, 1956) and Ninth Meeting (June 24-28, 1957), London.

ISRAEL:

Fishermen's Bulletin, no. 16, June 1958, 37 pp., illus., printed in Hebrew. Ministry of Agriculture, Division of Fisheries, P. O. Box 699, Haifa, Israel. Contains, among others, the following articles: "Around the Fisheries of Israel," by M. Shavit; "The Israel Trawl Fishery in 1957," with summary in English, by E. Gottlieb and S. Lipstadt; "Fishing Methods Prior to the Use of Nets," by M. Nun; "Sardine Fishery During May 1958," by Y. Ariav; and "Freezing and Export of Ink Fish," by S. Siskin.

MARINE SCIENCE:

Las Investigaciones Maritimas (Maritime Investigations), publication 1, 16 pp., illus., printed in Spanish. Universidad Catolica de Santo Tomas de Villanueva, Apartado No. 6, Marianao, Havana, Cuba, Feb. 1958.

MULLET:

Growth of the Black Mullet (MUGIL CEPHALUS L.), in West and Northwest Florida, by Gordon C. Broadhead, Technical Series No. 25, 31 pp., illus., printed. State Board of Conservation, Tallahassee, Fla., June 1958. The Marine Laboratory of the University of Miami, at the request of the Florida State Board of Conservation, has been engaged in a study of the Florida mullet fishery since 1948. In 1948 the industry felt that the stocks of mullet were declining because of a lack of proper management in the fishery. Complaints on overfishing, taking small fish, and on the capture of spawning individuals were voiced from the industry. The Board of Conservation provided the funds for an evaluation of the biological and economic status of the fishery. The mullet fishery is the most valuable of the fin fisheries of Florida. Work on the fishery covered the years 1948-1954. This report covers the methods of sampling, growth of tagged mullet, study of mullet scales, relationship of scale radius to fish length, validity of the scale method for age determination of black mullet, and growth rates of black mullet.

NORWAY:

"Fisket ved Vest-Gronland og Newfoundland 1957 " (Fishery off West Greenland and Newfoundland 1957), article, Fiskets Gang, vol. 18, no. 38, September 1958, pp. 487-496, illus., printed in Norwegian with English summary. Fiskets Gang, Postgiro nr. 691, 81, Bergen, Norway. In 1957, 53 Norwegian vessels fished for cod and halibut off West Greenland and Newfoundland. Of these, 2 were trawlers while of the other 51 long-line vessels, 5 were fishing mainly for halibut. The landings amounted to 12,023.7 metric tons of salted cod, 771.7 tons of frozen halibut, 33.9 tons of other fish, and 450.0 tons of cod-liver oil. The value to the fishermen of fish and byproducts totaled 21.7 million kroner (US$3.04 million). Some 20-23 vessels worked the Newfoundland banks during 1957. It is estimated that the Newfoundland area accounted for 5,390 tons of the landings of salted cod and 363 tons of the landings of frozen halibut. The trawlers operated off Greenland during the whole season.

Norwegian Fishing News, vol. 5, no. 2, 1958, 27 pp., illus., printed. Norwegian Fishing News, Ltd., Bergen, Norway. Contains, among others, the following articles: "Chemistry as a Source of New Developments Within the Fishing Industry;" "The Freezing in Alginate Jelly;" and "The Development of Echo-Sounding and Echo-Ranging," by Cmdr. R. G. Haines.

Oversikt over den Norske Fiskeristatistikken (Review of Norwegian Fisheries Statistics), by Knut Friis, Fiskeridirektoratets Smaskrifter No. 3, 11 pp., printed in Norwegian. (Reprinted from Fiskets Gang, no. 29, 1958.) Director of Fisheries, Bergen, Norway, 1958.

PARASITES:

LERNAEOCERA OBTUSA N. SP. Its Biology and its Effects on the Haddock, by Z. Kabata, Marine Research no. 3, 1958, 26 pp., illus., printed, price 8s. (US$1.12). Her Majesty's Stationery Office, 13A Castle Street, Edinburgh 2, Scotland. The first part of this report deals with the biology of Lernaeocera obtusa. The life history of this copepod parasite of haddock is discussed. By an examination of the relative abundance of various developmental phases throughout the year and by the age composition of the parasite population on the final host, its life span is estimated at about 1½ years. Reproductive activity

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and sexual behavior of larvae have been observed by examining larval populations on the intermediate host, the lemon sole. The period spent by the larvae on this fish has been estimated at about six weeks. The distribution of the parasite is discussed and its dependence on the distribution and abundance of the hosts considered. The relationship between the abundance of lemon sole and the degree of infestation of haddock is demonstrated. The rate of infestation increases with the size of the haddock. The parasite attaches itself mainly in the postero-lateral corner of the gills and from there penetrates the wall of a major blood vessel, from which, intermittently, it extracts blood, its sole food. The second part of the report is concerned with the effects of the parasite on the haddock. These effects consist of secondary anemia with associated phenomena, loss of weight, and loss of liver fat. All three factors undergo increase initially, but then show marked decreases. The increase is probably caused by an overshooting of a compensatory reaction. No retardation of growth is observed. The possibility of a retardation of sexual development is suggested, but cannot be regarded as proved.

POISONOUS FISH:

"Peces Venenosos" (Poisonous Fish), by Dr. Bruce W. Healstead, article, Mar y Pesca (Sea and Fishing), vol. II, no. 3, August 1958, pp. 5-13, illus., printed in Spanish. Instituto Nacional de la Pesca, Malecon 55, Havana, Cuba.

PRESERVATION:

"Some Recent Experiments on Preservation of Fish with Tetracycline Antibiotics," by B. A. Southcott, R. Moyer, E. G. Baker, and H. L. A. Tarr, article, Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, no. 110, April 1958, pp. 16-18, printed. Fisheries Research Board of Canada, Ottawa, Canada.

PROTEINS:

"Fish Proteins--Nutritive Value," by K. S. Ambe and K. Sohonie, article, Indian Journal of Fisheries, vol. 4, no. 1, April 1957, p. 113, printed. Editorial Committee, Central Marine Fisheries Research Station, Mandapam Camp, South India.

"Fish Proteins--Nutritive Value," by S. Konosu, S. Katori, R. Ota, S. Eguchi, and T. Mori, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 21, no. 11, p. 1163, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, Tokyo, Japan, 1956.

SHARKS:

Hakjerringa og hakjerring fisket (Nurse Shark and Nurse Shark Fishery), by Levy Carlson, Fiskeridirectoratets Skrifter, Serie Fiskeri, vol. IV, no. 1, 36 pp., illus., printed in Norwegian. The Director of Fisheries, Bergen, Norway, 1958.

SHRIMP:

Estado Actual de la Pesca del Camaron en Cuba (The Present Situation of the Cuban Shrimp Fishery), by Dr. Jose A. Suarez Caabro, monograph 5, 15 pp., processed in Spanish with English summary. Universidad Catolica de Santo Tomas de Villanueva, Apartado No. 6, Marianao, Havana, Cuba, June 1958.

SPAIN:

Investigacion Pesquera (Fishery Investigation), vol. XI, January 1958, 138 pp., illus., printed in Spanish. Instituto de Investigaciones Pesqueras, Universidad de Barcelona, Barcelona, Spain. Contains, among others, the following articles: "Cefalopodos de Cataluna" (Cephaalopods of Catalonia), by E. Morales; "Variacion Estacional de la Composicion Quimica del Mejillon (Mytilus edulis). II. Hidratos de Carbono" (Seasonal Variation in the Chemical Composition of the Mussel, Mytilus edulis, II. Hydrocarbons), by F. Fraga; "Datos Climaticos del Puerto de Castellon y Termicos de las Aguas Costeras Superficiales en Relaciones con la Pesca, en 1956" (Climatic Data of the Port of Castellon and Thermals of the Shallow Coastal Waters in Relation to the Fish, 1956), by Juan Herrera; and "Componente Vertioal de los Movimientos del Agua en la Ria de Vigo y su Posible Relacion con la Entrada de Sardina" (Vertical Component of the Tides in the Estuary of Vigo and its Possible Relation to the Entrance of Sardine), by R. Margalef and B. Andreu.

SPORT FISH:

"The Sport Fisheries of Great South Bay," by Irwin M. Alperin, article, The New York State Conservationist, vol. 13, no. 1, August-September 1958, pp. 10-12, illus., printed, single copy 50 cents. New York State Conservation Dept., State Campus, Albany, N. Y. For more than two years now biologists of the Fish Research Unit at the New York State Conservation Department's Marine District Office, Freeport, Long Island, have pried into the affairs of the fish and the fishermen of Great South Bay. Along with the biological studies, statistical data of the sport fisheries, with particular attention to fluke (also known as summer flounder or even fillet of sole at your favorite restaurant), have been collected and analyzed to keep abreast of the present utilization of finfish resources in the study area. From late spring to early fall 1957 an estimated 276,500 anglers tried their luck on Great South Bay and of these 213,348 were fishing, at least part time, for fluke.

TIDAL CURRENTS:

Tidal Current Tables, 1959 (Pacific Coast of North America and Asia), 238 pp., illus., processed, 50 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C. Among the tables included in this volume is one giving the predicted times of slack water (no current) and the predicted times and velocities of strength of current for each day of the year at 30 reference stations on the Pacific Coast of North America and Asia. This information can also be obtained for more than 2,100 other places through the use of a table of current differences and other constants which is also included.

Also contains a table for obtaining the velocity of the current at any intermediate time, a

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table giving the duration of slack, and a table of astronomical data for 1959. Coastal tidal currents, wind-driven currents, and the combination of currents are also discussed in the publication.

Aside from their obvious use as an aid to marine navigation, the Tidal Current Tables are indispensable to the engineer engaged in the maintenance and improvement of channels and harbors, in marine construction and improvement of beaches, and in the problem of sewage disposal.

Current tables for the Pacific coast first appeared in 1898 as a part of the tide tables. They then consisted of brief directions for obtaining the times of slack water for a few locations from the times of high and low water. In the following year daily predictions of slack water for two stations were given, and by 1923 the tables had so expanded that they were then issued as a separate publication. This year the tables are continued under a format that was adopted for the 1958 tables after an extensive survey among maritime users.

Although tidal currents at all places are affected by the moon, the declinational effect (north and south of the equator) is so pronounced at two particular stations--Unimak Pass, Aleutian Islands, and San Bernardino Strait, Philippine Islands--that separate pages are allotted for an explanation of predictions at these stations.

TIDES:

Tide Tables--Central and Western Pacific Ocean and Indian Ocean, 1959, 377 pp., printed, 75 cents. U. S. Department of Commerce, Coast and Geodetic Survey, Washington 25, D. C. This volume contains the daily predictions of times and heights of high and low waters, listed in the same column in chronological order, for 72 reference stations. The tidal differences and other constants, by means of which predictions can be obtained for about 1,500 other places listed in the tables, are also given. Predicted heights are determined from the data of soundings on the largest scale chart of the locality. To find the actual depth of water at any time, the height of the tide should be added to the charted depth. If the predicted height is negative it should be subtracted. This publication contains a table for obtaining the height of tide at any time, and other auxiliary tables that are useful to the navigator. It is one of four tide tables which include the entire maritime world. Together they contain daily predictions for 188 reference ports and differences and other constants for about 5,000 stations. Most of the predictions listed in this edition were furnished by cooperative hydrographic and geodetic agencies in Japan, England, India, France, Thailand, and the Philippine Islands.

TUNA:

Inter-American Tropical Tuna Commission Annual Report for the Year 1957, 134 pp., illus., printed in Spanish and English. Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, Calif. Contains the annual report of the Commission and a report of the Director on investigations during the year 1957. The annual report discussed the program and progress of investigations, and publication of research results. The Director's report discusses the compilation of current statistics of total catch, amount and success of fishing, and abundance of the fish population; current status of the tuna populations; potential fishing power of the fishing fleet; other studies of tuna catch statistics; research on tuna population structure and migrations; other aspects of tuna life history and behavior; investigations of physical, chemical, and biological oceanography and tuna ecology; and investigations of the biology, ecology, and life history of bait fishes.

TURKEY:

La Peche aux Crevettes en Turquie (Shrimp Fishing off the Turkish Coasts), by Dogan Iyigungor, 6 pp., illus., printed in French with brief summary in English. (Reprinted from FAO Debats et Documents Techniques, No. 4, pp. 63-68) Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1957. The author states that "Turkey has important shrimp resources. Shrimp fishing is still little developed. It has little importance for the economy of the country. Gear used are shrimp pots and baskets. Near Iskenderun, shrimp are caught by means of trawls. It would be necessary to use the efficient fishing methods and gear employed in other countries to develop shrimp fishing in Turkey and in the Mediterranean region."

UNITED KINGDOM:

Sea Fisheries Statistical Tables, 1957, 36 pp. (mostly tables), printed, 4s. (56 U. S. cents). Ministry of Agriculture, Fisheries, and Food, London, England. (Available from Her Majesty's Stationery Office, London, England.) Includes statistics on the quantity, total value, and average value of fish and shellfish production in England and Wales by species, region, and other categories for 1957. Breakdowns by first-class British vessels (steam trawlers), demersal landings, and pelagic landings are presented. Data on imports and exports are included. Also given are the number of fishermen, number and gross tonnage of vessels, and number of first-class vessels by stations and type of gear.

WHALES:

"Frozen Whale Meat," by T. Tanaka and K. Tanaka, article, Refrigeration (Japan), vol. 32, no. 351, 1956, p. 6, printed. Japanese Society of Refrigeration, No. 3, 1-Chome, Ginza Nishi, Chuo-ku, Tokyo, Japan. According to the authors, to obtain frozen whale meat of biochemically superior quality which not only exudes a small amount of drip but also has a good taste on thawing, freezing the meat is recommended at its early stage of postrigor or at its prerigor state and removing the contractability by keeping it in a room at moderate temperatures (-2° C. to -3° C. or 28.4° F to 26.6° F.) for a short period (5 to 10 days) just before defrosting.

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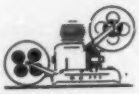
INT.-DUP. SEC., WASH., D.C. 46645

FISHERY MOTION PICTURE



The following motion picture is available only from the source given in the listing.

Fish Cookery with Savoir is a 16 mm. 14-minute sound and color film of particular interest to young housewives. It was produced by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, as part of the Bureau's responsibility for more general appreciation of the role fishery products can play in day-to-day meal preparation. Funds provided by the Saltonstall-Kennedy Act of 1954 (which provides, among other things, for consumer education as part of the general program to promote the free flow of domestically-produced fishery products in commerce) were used to make the film.

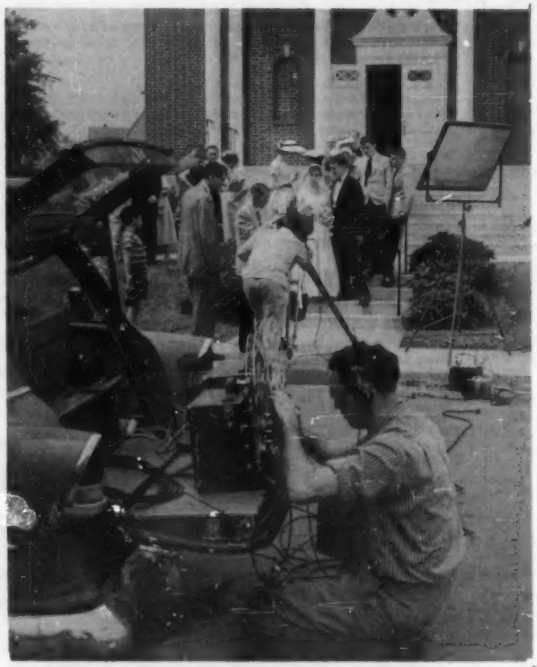


Fig. 1 - Camera crew filming one of the scenes for the new film--Fish Cookery with Savior.

Unique in presentation, with Monsieur Henri Savoir, an imaginary and imaginative master of fish cookery, rendering invisible but pertinent aid to the perplexed housewife, the picture emphasizes the value of fishery products for wholesome, tasty, and easy-to-prepare meals.

This film, like other fishery films produced by the Bureau, is available for free showings to large or small groups. It is appropriate for business, for educational purposes, and other meetings attended by housewives.

At the present time, the Bureau of Commercial Fisheries is distributing prints of 15 different educational and market development films, most of which are suitable for general audiences. Pictures completed within the last two years, all sound-color, 16 mm. films, include Outboard Fisherman USA, Fresh Out of The Water, Shrimp Tips from New Orleans, and Sardines from Maine - Down-East Style. All of these films, with the exception of Fresh Out of the Water, were financed by segments of the fishing industry.

Three other pictures are currently in production. One of these will portray traditional outdoor fish cookery methods and is a Saltonstall-Kennedy Act project. The other two, which will be supplemented by an informative full-color booklet, relate to the salmon industry in Alaska and the Pacific Northwest and are being financed by the salmon industry.

Bureau of Commercial Fisheries' films are available on loan for free showings through nearly 150 film libraries. Also, most of the films are cleared for television. To borrow any of the films, or for more information about them, write to the Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.